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(54) Title: CLONING OF CYTOCHROME P450 GENES FROM NICOTIANA

(57) Abstract: The present invention relates to p450 enzymes and nucleic acid sequences encoding p450 enzymes in Nicotiana, and methods of using those enzymes and nucleic acid sequences to alter plant phenotypes.

CLONING OF CYTOCHROME P450 GENES FROM NICOTIANA

The present invention relates to nucleic acid sequences encoding cytochrome p450 enzymes (hereinafter referred to as p450 and p450 enzymes) in *Nicotiana* plants and methods for using those nucleic acid sequences to alter plant phenotypes.

BACKGROUND

Cytochrome p450s catalyze enzymatic reactions for a diverse range of chemically dissimilar substrates that include the oxidative, peroxidative and reductive metabolism of endogenous and xenobiotic substrates. In plants, p450s participate in biochemical pathways that include the synthesis of plant products such as phenylpropanoids, alkaloids, terpenoids, lipids, cyanogenic glycosides, and glucosinolates (Chappel, Annu. Rev. Plant Physiol. Plant Mol. Biol. 198, 49:311-343). Cytochrome p450s, also known as p450 heme-thiolate proteins, usually act as terminal oxidases in multi-component electron transfer chains, called p450-containing monooxygenase systems. Specific reactions catalyzed include demethylation, hydroxylation, epoxidation, N-oxidation, sulfooxidation, N-, S-, and O-dealkylations, desulfation, deamination, and reduction of azo, nitro, and N-oxide groups.

The diverse role of *Nicotiana* plant p450 enzymes has been implicated in effecting a variety of plant

metabolites such as phenylpropanoids, alkaloids, terpenoids, lipids, cyanogenic glycosides, glucosinolates and a host of other chemical entities. During recent years, it is becoming apparent that some p450 enzymes can impact the composition of plant metabolites in plants. For example, it has been long desired to improve the flavor and aroma of certain plants by altering its profile of selected fatty acids through breeding; however very little is known about mechanisms involved in controlling the levels of these leaf constituents. The down regulation of p450 enzymes associated with the modification of fatty acids may facilitate accumulation of desired fatty acids that provide more preferred *leaf* phenotypic qualities. The function of p450 enzymes and their broadening roles in plant constituents is still being discovered. For instance, a special class of p450 enzymes was found to catalyze the breakdown of fatty acid into volatile C6- and C9-aldehydes and -alcohols that are major contributors of "fresh green" odor of fruits and vegetables. The level of other novel targeted p450s may be altered to enhance the qualities of leaf constituents by modifying lipid composition and related break down metabolites in Nicotiana leaf. Several of these constituents in leaf are affected by senescence that stimulates the maturation of leaf quality properties. Still other reports have shown that p450s enzymes are play a functional role in altering fatty acids that are involved in plant-pathogen interactions and disease resistance.

In other instances, p450 enzymes have been suggested to be involved in alkaloid biosynthesis. Nornicotine is a minor alkaloid found in *Nicotiana tabaceum*. It has been postulated that it is produced by the p450 mediated demethylation of nicotine followed by acylation and nitrosation at the N position thereby producing a series of N-acylnonicotines and N-nitrosonornicotines. N-demethylation, catalyzed by a putative p450 demethylase, is thought to be a primary source of nornicotine biosyntheses in *Nicotiana*. While the enzyme is believed to be microsomal, thus far a nicotine demethylase enzyme has not been successfully purified, nor have the genes involved been isolated.

Furthermore, it is hypothesized but not proven that the activity of p450 enzymes is genetically controlled and also strongly influenced by environment factors. For example, the demethylation of nicotine in *Nicotiana* is thought to increase substantially when the plants reach a mature stage. Furthermore, it is hypothesized yet not proven that the demethylase gene contains a transposable element that can inhibit translation of RNA when present.

The large multiplicity of p450 enzyme forms, their differing structure and function have made their research on *Nicotiana* p450 enzymes very difficult before the enclosed invention. In addition, cloning of p450 enzymes has been hampered at least in part because these

membrane-localized proteins are typically present in low abundance and often unstable to purification. Hence, a need exists for the identification of p450 enzymes in plants and the nucleic acid sequences associated with those p450 enzymes. In particular, only a few cytochrome p450 proteins have been reported in Nicotiana. The inventions described herein entail the discovery of a substantial number of cytochrome p450 fragments that correspond to several groups of p450 species based on their sequence identity.

SUMMARY

The present invention is directed to plant p450 enzymes. The present invention is further directed to plant p450 enzymes from *Nicotiana*. The present invention is also directed to p450 enzymes in plants whose expression is induced by ethylene and/or plant senescence. The present invention is yet further directed to nucleic acid sequences in plants having enzymatic activities, for example, being categorized as oxygenase, demethylase and the like, or other and the use of those sequences to reduce or silence the expression or over-expression of these enzymes. The invention also relates to p450 enzymes found in plants containing higher nornicotine levels than plants exhibiting lower nornicotine levels.

In one aspect, the invention is directed to nucleic acid sequences as set forth in SEQ. ID. Nos. 1, 3, 5, 7,

9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295 and 297.

In a second related aspect, those fragments containing greater than 75% identity in nucleic acid sequence were placed into groups dependent upon their identity in a region corresponding to the first nucleic acid following the cytochrome p450 motif GXRXCX(G/A) to the stop codon. The representative nucleic acid groups and respective species are shown in Table I.

In a third aspect, the invention is directed to amino acid sequences as set forth in SEQ. ID. Nos. 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 96, 98, 100, 102, 104, 106, 108, 110, 112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 144, 146, 148, 150, 152, 154, 156, 158, 160, 162,

164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 208, 210, 212, 214, 216, 218, 220, 222, 224, 226, 228, 230, 232, 234, 236, 238, 240, 242, 244, 246, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296 and 298.

In a fourth related aspect, those fragments containing greater than 71% identity in amino acid sequence were placed into groups dependent upon their identity to each other in a region corresponding to the first amino acid following the cytochrome p450 motif GXRXCX(G/A) to the stop codon. The representative amino acid groups and respective species are shown in Table II.

In a fifth aspect, the invention is directed to amino acid sequences of full length genes as set forth in SEQ. ID. Nos. 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 208, 210, 212, 214, 216, 218, 220, 222, 224, 226, 228, 230, 232, 234, 236, 238, 240, 242, 244, 246, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296 and 298.

In a sixth related aspect, those full length genes containing 85% or greater identity in amino acid sequence were placed into groups dependent upon the identity to

each other. The representative amino acid groups and respective species are shown in Table III.

In a seventh aspect, the invention is directed to amino acid sequences of the fragments set forth in SEQ. ID. Nos. 299-357.

In the eighth related aspect, those fragments containing 90% or greater identity in amino acid sequence were placed into groups dependent upon their identity to each other in a region corresponding to the first cytochrome p450 domain, UXXRXXZ, to the third cytochrome domain, GXRXO, where U is E or K, X is any amino acid and Z is R, T, S or M. The representative amino acid groups respective species shown in Table IV.

In a ninth related aspect, the reduction or elimination or over-expression of p450 enzymes in Nicotiana plants may be accomplished transiently using RNA viral systems.

Resulting transformed or infected plants are assessed for phenotypic changes including, but not limited to, analysis of endogenous p450 RNA transcripts, p450 expressed peptides, and concentrations of plant metabolites using techniques commonly available to one having ordinary skill in the art.

In a tenth important aspect, the present invention is also directed to generation of trangenic Nicotiana

lines that have altered p450 enzyme activity levels. In accordance with the invention, these transgenic lines include nucleic acid sequences that are effective for reducing or silencing or increasing the expression of certain enzyme thus resulting in phenotypic effects within Nicotiana. Such nucleic acid sequences include SEQ. ID. Nos. 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295 and 297.

In a very important eleventh aspect of the invention, plant cultivars including nucleic acids of the present invention in a down regulation capacity using either full length genes or fragments thereof or in an over-expression capacity using full length genes will have altered metabolite profiles relative to control plants.

In a twelfth aspect of the invention, plant cultivars including nucleic acid of the present invention

using either full length genes or fragments thereof in modifying the biosynthesis or breakdown of metabolites derived from the plant or external to the plants, will have use in tolerating certain exogenous chemicals or plant pests. Such nucleic acid sequences include SEQ ID. Nos. 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295 and 297.

In a thirteenth aspect, the present invention is directed to the screening of plants, more preferably Nicotiana, that contain genes that have substantial nucleic acid identity to the taught nucleic acid sequence. The use of the invention would be advantageous to identify and select plants that contain a nucleic acid sequence with exact or substantial identity where such plants are part of a breeding program for traditional or transgenic varieties, a mutagenesis program, or naturally occurring diverse plant populations. The screening of plants for substantial nucleic acid identity may be

accomplished by evaluating plant nucleic acid materials using a nucleic acid probe in conjunction with nucleic acid detection protocols including, but not limited to, nucleic acid hybridization and PCR analysis. The nucleic acid probe may consist of the taught nucleic acid sequence or fragment thereof corresponding to SEQ ID 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295 and 297.

In a fourteenth aspect, the present invention is directed to the identification of plant genes, more preferably Nicotiana, that share substantial amino acid identity corresponding to the taught nucleic acid sequence. The identification of plant genes including both cDNA and genomic clones, those cDNAs and genomic clones, more preferably from Nicotiana may be accomplished by screening plant cDNA libraries using a nucleic acid probe in conjunction with nucleic acid detection protocols including, but not limited to,

nucleic acid hybridization and PCR analysis. The nucleic acid probe may be comprised of nucleic acid sequence or fragment thereof corresponding to SEQ ID 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 143, 145 and 147.

In an alterative fifteenth aspect, cDNA expression libraries that express peptides may be screened using antibodies directed to part or all of the taught amino acid sequence. Such amino acid sequences include SEQ ID 2, 4, 8, 9, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 96, 98, 100, 102, 104, 106, 108, 110, 112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 144, 146, 148.

In a sixteenth important aspect, the present invention is also directed to generation of transgenic Nicotiana lines that have over-expression of p450 enzyme activity levels. In accordance with the invention, these transgenic lines include all nucleic acid sequences encoding the amino acid sequences of full length genes that are effective for increasing the expression of certain enzyme thus resulting in phenotypic effects within Nicotiana. Such amino acid sequences include SEQ.

ID. 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 208, 210, 212, 214, 216, 218, 220, 222, 224, 226, 228, 230, 232, 234, 236, 238, 240, 242, 244, 246, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296 and 298.

A tobacco product is also provided that includes tobacco leaf (lamina and/or stem) having reduced amounts of nornicotine. The tobacco product includes tobacco (tobacco leaf including lamina and/or stem) from a plant that includes the sequences described herein or where genes encoding tobacco specific nitrosamines have been eliminated or suppressed. The elimination or suppression of genes encoding tobacco speicific nitrosamines is effective for reducing tobacco specific nitrosamines in the tobacco products from about 5 to about 10%, in another aspect from about 10 to 20%, in another aspect about 20 to 30%, and in another aspect greate than 30%, as compared to tobacco products made from tobacco plants where gnees coding for tobacco specific nitrosamines have not been eliminated or suppressed. As used herein, the tobacco product may include cigarettes, cigars, pipe tobacco, snuff chewing tobacco, products blended with the tobacco product, and mixtures thereof.

BRIEF DESCRIPTION OF DRAWINGS

Figure 1 shows nucleic acid SEQ. ID. No.:1 and amino acid SEQ. ID. No.:2.

Figure 2 shows nucleic acid SEQ. ID. No.:3 and amino acid SEQ. ID. No.:4.

Figure 3 shows nucleic acid SEQ. ID. No.:5 and amino acid SEQ. ID. No.:6.

Figure 4 shows nucleic acid SEQ. ID. No.:7 and amino acid SEQ. ID. No.:8.

Figure 5 shows nucleic acid SEQ. ID. No.:9 and amino acid SEQ. ID. No.:10.

Figure 6 shows nucleic acid SEQ. ID. No.:11 and amino acid SEQ. ID. No.:12.

Figure 7 shows nucleic acid SEQ. ID. No.:13 and amino acid SEQ. ID. No.:14.

Figure 8 shows nucleic acid SEQ. ID. No.:15 and amino acid SEQ. ID. No.:16.

Figure 9 shows nucleic acid SEQ. ID. No.:17 and amino acid SEQ. ID. No.:18.

Figure 10 shows nucleic acid SEQ. ID. No.:19 and amino acid SEQ. ID. No.:20.

Figure 11 shows nucleic acid SEQ. ID. No.:21 and amino acid SEQ. ID. No.:22.

Figure 12 shows nucleic acid SEQ. ID. No.:23 and amino acid SEQ. ID. No.:24.

Figure 13 shows nucleic acid SEQ. ID. No.:25 and amino acid SEQ. ID. No.:26.

Figure 14 shows nucleic acid SEQ. ID. No.:27 and amino acid SEQ. ID. No.:28.

Figure 15 shows nucleic acid SEQ. ID. No.:29 and amino acid SEQ. ID. No.:30.

Figure 16 shows nucleic acid SEQ. ID. No.:31 and amino acid SEQ. ID. No.:32.

Figure 17 shows nucleic acid SEQ. ID. No.:33 and amino acid SEQ. ID. No.:34.

Figure 18 shows nucleic acid SEQ. ID. No.:35 and amino acid SEQ. ID. No.:36.

Figure 19 shows nucleic acid SEQ. ID. No.:37 and amino acid SEQ. ID. No.:38.

Figure 20 shows nucleic acid SEQ. ID. No.:39 and amino acid SEQ. ID. No.:40.

Figure 21 shows nucleic acid SEQ. ID. No.:41 and amino acid SEQ. ID. No.:42.

Figure 22 shows nucleic acid SEQ. ID. No.:43 and amino acid SEQ. ID. No.:44.

Figure 23 shows nucleic acid SEQ. ID. No.:45 and amino acid SEQ. ID. No.:46.

Figure 24 shows nucleic acid SEQ. ID. No.:47 and amino acid SEQ. ID. No.:48.

Figure 25 shows nucleic acid SEQ. ID. No.:49 and amino acid SEQ. ID. No.:50.

Figure 26 shows nucleic acid SEQ. ID. No.:51 and amino acid SEQ. ID. No.:52.

Figure 27 shows nucleic acid SEQ. ID. No.:53 and amino acid SEQ. ID. No.:54.

Figure 28 shows nucleic acid SEQ. ID. No.:55 and amino acid SEQ. ID. No.:56.

Figure 29 shows nucleic acid SEQ. ID. No.:57 and amino acid SEQ. ID. No.:58.

Figure 30 shows nucleic acid SEQ. ID. No.:59 and amino acid SEQ. ID. No.:60.

Figure 31 shows nucleic acid SEQ. ID. No.:61 and amino acid SEQ. ID. No.:62.

Figure 32 shows nucleic acid SEQ. ID. No.:63 and amino acid SEQ. ID. No.:64.

Figure 33 shows nucleic acid SEQ. ID. No.:65 and amino acid SEQ. ID. No.:66.

Figure 34 shows nucleic acid SEQ. ID. No.:67 and amino acid SEQ. ID. No.:68.

Figure 35 shows nucleic acid SEQ. ID. No.:69 and amino acid SEQ. ID. No.:70.

Figure 36 shows nucleic acid SEQ. ID. No.:71 and amino acid SEQ. ID. No.:72.

Figure 37 shows nucleic acid SEQ. ID. No.:73 and amino acid SEQ. ID. No.:74.

Figure 38 shows nucleic acid SEQ. ID. No.:75 and amino acid SEQ. ID. No.:76.

Figure 39 shows nucleic acid SEQ. ID. No.:77 and amino acid SEQ. ID. No.:78.

Figure 40 shows nucleic acid SEQ. ID. No.:79 and amino acid SEQ. ID. No.:80.

Figure 41 shows nucleic acid SEQ. ID. No.:81 and amino acid SEQ. ID. No.:82.

Figure 42 shows nucleic acid SEQ. ID. No.:83 and amino acid SEQ. ID. No.:84.

Figure 43 shows nucleic acid SEQ. ID. No.:85 and amino acid SEQ. ID. No.:86.

Figure 44 shows nucleic acid SEQ. ID. No.:87 and amino acid SEQ. ID. No.:88.

Figure 45 shows nucleic acid SEQ. ID. No.:89 and amino acid SEQ. ID. No.:90.

Figure 46 shows nucleic acid SEQ. ID. No.:91 and amino acid SEQ. ID. No.:92.

Figure 48 shows nucleic acid SEQ. ID. No.:95 and amino acid SEQ. ID. No.:96.

Figure 49 shows nucleic acid SEQ. ID. No.:97 and amino acid SEQ. ID. No.:98.

Figure 50 shows nucleic acid SEQ. ID. No.:99 and amino acid SEQ. ID. No.:100.

Figure 51 shows nucleic acid SEQ. ID. No.:101 and amino acid SEQ. ID. No.:102.

Figure 52 shows nucleic acid SEQ. ID. No.:103 and amino acid SEQ. ID. No.:104.

Figure 53 shows nucleic acid SEQ. ID. No.:105 and amino acid SEQ. ID. No.:106.

Figure 54 shows nucleic acid SEQ. ID. No.:107 and amino acid SEQ. ID. No.:108.

Figure 55 shows nucleic acid SEQ. ID. No.:109 and amino acid SEQ. ID. No.:110.

Figure 56 shows nucleic acid SEQ. ID. No.:111 and amino acid SEQ. ID. No.:112.

Figure 57 shows nucleic acid SEQ. ID. No.:113 and amino acid SEQ. ID. No.:114.

Figure 58 shows nucleic acid SEQ. ID. No.:115 and amino acid SEQ. ID. No.:116.

Figure 59 shows nucleic acid SEQ. ID. No.:117 and amino acid SEQ. ID. No.:118.

Figure 60 shows nucleic acid SEQ. ID. No.:119 and amino acid SEQ. ID. No.:120.

Figure 61 shows nucleic acid SEQ. ID. No.:121 and amino acid SEQ. ID. No.:122.

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Figure 63 shows nucleic acid SEQ. ID. No.:125 and amino acid SEQ. ID. No.:126.

Figure 64 shows nucleic acid SEQ. ID. No.:127 and amino acid SEQ. ID. No.:128.

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Figure 70 shows nucleic acid SEQ. ID. No.:139 and amino acid SEQ. ID. No.:140.

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Figure 73 shows nucleic acid SEQ. ID. No.:145 and amino acid SEQ. ID. No.:146.

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Figure 75 shows nucleic acid SEQ. ID No.: 149 and amino acid SEQ. ID. No.: 150.

Figure 76 shows nucleic acid SEQ. ID No.: 151 and amino acid SEQ. ID. No.: 152.

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Figure 82 shows nucleic acid SEQ. ID No.: 163 and amino acid SEQ. ID. No.: 164.

Figure 83 shows nucleic acid SEQ. ID No.: 165 and amino acid SEQ. ID. No.: 166.

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Figure 99 shows nucleic acid SEQ. ID No.: 197 and amino acid SEQ. ID. No.: 198.

Figure 100 shows nucleic acid SEQ. ID No.: 199 and amino acid SEQ. ID. No.: 200.

Figure 101 shows nucleic acid SEQ. ID No.: 201 and amino acid SEQ. ID. No.: 202.

Figure 102 shows nucleic acid SEQ. ID No.: 203 and amino acid SEQ. ID. No.: 204.

Figure 103 shows nucleic acid SEQ. ID No.: 205 and amino acid SEQ. ID. No.: 206.

Figure 104 shows nucleic acid SEQ. ID No.: 207 and amino acid SEQ. ID. No.: 208.

Figure 105 shows nucleic acid SEQ. ID No.: 209 and amino acid SEQ. ID. No.: 210.

Figure 106 shows nucleic acid SEQ. ID No.: 211 and amino acid SEQ. ID. No.: 212.

Figure 107 shows nucleic acid SEQ. ID No.: 213 and amino acid SEQ. ID. No.: 214.

Figure 108 shows nucleic acid SEQ. ID No.: 215 and amino acid SEQ. ID. No.: 216.

Figure 109 shows nucleic acid SEQ. ID No.: 217 and amino acid SEQ. ID. No.: 218.

Figure 110 shows nucleic acid SEQ. ID No.: 219 and amino acid SEQ. ID. No.: 220.

Figure 111 shows nucleic acid SEQ. ID No.: 221 and amino acid SEQ. ID. No.: 222.

Figure 112 shows nucleic acid SEQ. ID No.: 223 and amino acid SEQ. ID. No.: 224.

Figure 113 shows nucleic acid SEQ. ID No.: 225 and amino acid SEQ. ID. No.: 226.

Figure 114 shows nucleic acid SEQ. ID No.: 227 and amino acid SEQ. ID. No.: 228.

Figure 115 shows nucleic acid SEQ. ID No.: 229 and amino acid SEQ. ID. No.: 230.

Figure 116 shows nucleic acid SEQ. ID No.: 231 and amino acid SEQ. ID. No.: 232.

Figure 117 shows nucleic acid SEQ. ID No.: 233 and amino acid SEQ. ID. No.: 234.

Figure 118 shows nucleic acid SEQ. ID No.: 235 and amino acid SEQ. ID. No.: 236.

Figure 119 shows nucleic acid SEQ. ID No.: 237 and amino acid SEQ. ID. No.: 238.

Figure 120 shows nucleic acid SEQ. ID No.: 239 and amino acid SEQ. ID. No.: 240.

Figure 121 shows nucleic acid SEQ. ID No.: 241 and amino acid SEQ. ID. No.: 242.

Figure 122 shows nucleic acid SEQ. ID No.: 243 and amino acid SEQ. ID. No.: 244.

Figure 123 shows nucleic acid SEQ. ID No.: 245 and amino acid SEQ. ID. No.: 246.

Figure 124 shows nucleic acid SEQ. ID No.: 247 and amino acid SEQ. ID. No.: 248.

Figure 125 shows nucleic acid SEQ. ID No.: 249 and amino acid SEQ. ID. No.: 250.

Figure 126 shows nucleic acid SEQ. ID No.: 251 and amino acid SEQ. ID. No.: 252.

Figure 127 shows nucleic acid SEQ. ID No.: 253 and amino acid SEQ. ID. No.: 254.

Figure 128 shows nucleic acid SEQ. ID No.: 255 and amino acid SEQ. ID. No.: 256.

Figure 129 shows nucleic acid SEQ. ID No.: 257 and amino acid SEQ. ID. No.: 258.

Figure 130 shows nucleic acid SEQ. ID No.: 259 and amino acid SEQ. ID. No.: 260.

Figure 131 shows nucleic acid SEQ. ID No.: 261 and amino acid SEQ. ID. No.: 262.

Figure 132 shows nucleic acid SEQ. ID No.: 263 and amino acid SEQ. ID. No.: 264.

Figure 133 shows nucleic acid SEQ. ID No.: 265 and amino acid SEQ. ID. No.: 266.

Figure 134 shows nucleic acid SEQ. ID No.: 267 and amino acid SEQ. ID. No.: 268.

Figure 135 shows nucleic acid SEQ. ID No.: 269 and amino acid SEQ. ID. No.: 270.

Figure 136 shows nucleic acid SEQ. ID No.: 271 and amino acid SEQ. ID. No.: 272.

Figure 137 shows nucleic acid SEQ. ID No.: 273 and amino acid SEQ. ID. No.: 274.

Figure 138 shows nucleic acid SEQ. ID No.: 275 and amino acid SEQ. ID. No.: 276.

Figure 139 shows nucleic acid SEQ. ID No.: 277 and amino acid SEQ. ID. No.: 278.

Figure 140 shows nucleic acid SEQ. ID No.: 279 and amino acid SEQ. ID. No.: 280.

Figure 141 shows nucleic acid SEQ. ID No.: 281 and amino acid SEQ. ID. No.: 282.

Figure 142 shows nucleic acid SEQ. ID No.: 283 and amino acid SEQ. ID. No.: 284.

Figure 143 shows nucleic acid SEQ. ID No.: 285 and amino acid SEQ. ID. No.: 286.

Figure 144 shows nucleic acid SEQ. ID No.: 287 and amino acid SEQ. ID. No.: 288.

Figure 145 shows nucleic acid SEQ. ID No.: 289 and amino acid SEQ. ID. No.: 290.

Figure 146 shows nucleic acid SEQ. ID No.: 291 and amino acid SEQ. ID. No.: 292.

Figure 147 shows nucleic acid SEQ. ID No.: 293 and amino acid SEQ. ID. No.: 294.

Figure 148 shows nucleic acid SEQ. ID No.: 295 and amino acid SEQ. ID. No.: 296.

Figure 149 shows nucleic acid SEQ. ID No.: 297 and amino acid SEQ. ID. No.: 298.

Figure 151 shows a comparison of Sequence Groups.

Figure 152 illustrates alignment of full length clones.

Figure 153 shows a procedure used for cloning of cytochrome p450 cDNA fragments by PCR

DETAILED DESCRIPTION

DEFINITIONS

Unless defined otherwise, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. Singleton et al. (1994) Dictionary of Microbiology and Molecular Biology, second edition, John Wiley and Sons (New York) provides one of skill with a general dictionary of many of the terms used in this invention. All patents and publications referred to herein are incorporated by reference herein. For purposes of the present invention, the following terms are defined below.

"Enzymatic activity" is meant to include demethylation, hydroxylation, epoxidation, N-oxidation, sulfooxidation, N-, S-, and O- dealkylations, desulfation, deamination, and reduction of azo, nitro, and N-oxide groups. The term "nucleic acid" refers to a deoxyribonucleotide or ribonucleotide polymer in either

single- or double-stranded form, or sense or anti-sense, and unless otherwise limited, encompasses known analogues of natural nucleotides that hybridize to nucleic acids in a manner similar to naturally occurring nucleotides. Unless otherwise indicated, a particular nucleic acid sequence includes the complementary sequence thereof.

The terms "operably linked", "in operable combination", and "in operable order" refer to functional linkage between a nucleic acid expression control sequence (such as a promoter, signal sequence, or array of transcription factor binding sites) and a second nucleic acid sequence, wherein the expression control sequence affects transcription and/or translation of the nucleic acid corresponding to the second sequence.

The term "recombinant" when used with reference to a cell indicates that the cell replicates a heterologous nucleic acid, expresses said nucleic acid or expresses a peptide, heterologous peptide, or protein encoded by a heterologous nucleic acid. Recombinant cells can express genes or gene fragments in either the sense or antisense form that are not found within the native (non-recombinant) form of the cell. Recombinant cells can also express genes that are found in the native form of the cell, but wherein the genes are modified and re-introduced into the cell by artificial means.

A "structural gene" is that portion of a gene comprising a DNA segment encoding a protein, polypeptide or a portion thereof, and excluding the 5' sequence which

drives the initiation of transcription. The structural gene may alternatively encode a nontranslatable product. The structural gene may be one which is normally found in the cell or one which is not normally found in the cell or cellular location wherein it is introduced, in which case it is termed a "heterologous gene". A heterologous gene may be derived in whole or in part from any source known to the art, including a bacterial genome or episome, eukaryotic, nuclear or plasmid DNA, cDNA, viral DNA or chemically synthesized DNA. A structural gene may contain one or more modifications that could effect biological activity or its characteristics, the biological activity or the chemical structure of the expression product, the rate of expression or the manner of expression control. Such modifications include, but are not limited to, mutations, insertions, deletions and substitutions of one or more nucleotides. The structural gene may constitute an uninterrupted coding sequence or it may include one or more introns, bounded by the appropriate splice junctions. The structural gene may be translatable or non-translatable, including in an anti-sense orientation. The structural gene may be a composite of segments derived from a plurality of sources and from a plurality of gene sequences (naturally occurring or synthetic, where synthetic refers to DNA that is chemically synthesized).

"Derived from" is used to mean taken, obtained, received, traced, replicated or descended from a source (chemical and/or biological). A derivative may be

produced by chemical or biological manipulation (including, but not limited to, substitution, addition, insertion, deletion, extraction, isolation, mutation and replication) of the original source.

"Chemically synthesized", as related to a sequence of DNA, means that portions of the component nucleotides were assembled in vitro. Manual chemical synthesis of DNA may be accomplished using well established procedures (Caruthers, Methodology of DNA and RNA Sequencing, (1983), Weissman (ed.), Praeger Publishers, New York, Chapter 1); automated chemical synthesis can be performed using one of a number of commercially available machines.

Optimal alignment of sequences for comparison may be conducted by the local homology algorithm of Smith and Waterman, Adv. Appl. Math. 2:482 (1981), by the homology alignment algorithm of Needleman and Wunsch, J. Mol. Biol. 48:443 (1970), by the search for similarity method of Pearson and Lipman Proc. Natl. Acad. Sci. (U.S.A.) 85: 2444 (1988), by computerized implementations of these algorithms (GAP, BESTFIT, FASTA, and TFASTA in the Wisconsin Genetics Software Package, Genetics Computer Group, 575 Science Dr., Madison, Wis.), or by inspection.

The NCBI Basic Local Alignment Search Tool (BLAST) (Altschul et al., 1990) is available from several sources, including the National Center for Biological Information (NCBI, Bethesda, Md.) and on the Internet, for use in connection with the sequence analysis programs

blastp, blastn, blastx, tblastn and tblastx. It can be accessed at http://www.ncbi.nlm.nih.gov/BLAST/. A description of how to determine sequence identity using this program is available at http://www.ncbi.nlm.nih.gov/BLAST/blast help.html.

The terms "substantial amino acid identity" or "substantial amino acid sequence identity" as applied to amino acid sequences and as used herein denote a characteristic of a polypeptide, wherein the peptide comprises a sequence that has at least 70 percent sequence identity, preferably 80 percent amino acid sequence identity, more preferably 90 percent amino acid sequence identity, and most preferably at least 99 to 100 percent sequence identity as compared to a reference group over region corresponding to the first amino acid following the cytochrome p450 motif GXRXCX(G/A) to the stop codon of the translated peptide.

The terms "substantial nucleic acid identity" or "substantial nucleic acid sequence identity" as applied to nucleic acid sequences and as used herein denote a characteristic of a polynucleotide sequence, wherein the polynucleotide comprises a sequence that has at least 75 percent sequence identity, preferably 81 percent sequence identity, more preferably at least 91 percent sequence identity, and most preferably at least 99 to 100 percent sequence identity as compared to a reference group over region corresponding to the first

nucleic acid following the cytochrome p450 motif GXRXCX(G/A) to the stop codon of the translated peptide.

Another indication that nucleotide sequences are substantially identical is if two molecules hybridize to each other under stringent conditions. Stringent conditions are sequence-dependent and will be different in different circumstances. Generally, stringent conditions are selected to be about 5°C to about 20°C, usually about 10°C to about 15°C, lower than the thermal melting point (Tm) for the specific sequence at a defined ionic strength and pH. The Tm is the temperature (under defined ionic strength and pH) at which 50% of the target sequence hybridizes to a matched probe. Typically, stringent conditions will be those in which the salt concentration is about 0.02 molar at pH 7 and the temperature is at least about 60°C. For instance in a standard Southern hybridization procedure, stringent conditions will include an initial wash in 6xSSC at 42 °C followed by one or more additional washes in 0.2xSSC at a temperature of at least about 55°C, typically about 60°C and often about 65°C.

Nucleotide sequences are also substantially identical for purposes of this invention when the polypeptides and/or proteins which they encode are substantially identical. Thus, where one nucleic acid sequence encodes essentially the same polypeptide as a second nucleic acid sequence, the two nucleic acid sequences are substantially identical, even if they would

not hybridize under stringent conditions due to degeneracy permitted by the genetic code (see, Darnell et al. (1990) Molecular Cell Biology, Second Edition Scientific American Books W. H. Freeman and Company New York for an explanation of codon degeneracy and the genetic code). Protein purity or homogeneity can be indicated by a number of means well known in the art, such as polyacrylamide gel electrophoresis of a protein sample, followed by visualization upon staining. For certain purposes high resolution may be needed and HPLC or a similar means for purification may be utilized.

As used herein, the term "vector" is used in reference to nucleic acid molecules that transfer DNA segment(s) into a cell. A vector may act to replicate DNA and may reproduce independently in a host cell. The term "vehicle" is sometimes used interchangeably with "vector." The term "expression vector" as used herein refers to a recombinant DNA molecule containing a desired coding sequence and appropriate nucleic acid sequences necessary for the expression of the operably linked coding sequence in a particular host organism. Nucleic acid sequences necessary for expression in prokaryotes usually include a promoter, an operator (optional), and a ribosome binding site, often along with other sequences. Eucaryotic cells are known to utilize promoters, enhancers, and termination and polyadenylation signals.

For the purpose of regenerating complete genetically engineered plants with roots, a nucleic acid may be inserted into plant cells, for example, by any technique such as in vivo inoculation or by any of the known in vitro tissue culture techniques to produce transformed plant cells that can be regenerated into complete plants. Thus, for example, the insertion into plant cells may be by in vitro inoculation by pathogenic or non-pathogenic *A. tumefaciens*. Other such tissue culture techniques may also be employed.

"Plant tissue" includes differentiated and undifferentiated tissues of plants, including, but not limited to, roots, shoots, leaves, pollen, seeds, tumor tissue and various forms of cells in culture, such as single cells, protoplasts, embryos and callus tissue. The plant tissue may be *in planta* or in organ, tissue or cell culture.

"Plant cell" as used herein includes plant cells *in planta* and plant cells and protoplasts in culture.

"cDNA" or "complementary DNA" generally refers to a single stranded DNA molecule with a nucleotide sequence that is complementary to an RNA molecule. cDNA is formed by the action of the enzyme reverse transcriptase on an RNA template.

STRATEGIES FOR OBTAINING NUCLEIC ACID SEQUENCES

In accordance with the present invention, RNA was extracted from Nicotiana tissue of converter and non-converter Nicotiana lines. The extracted RNA was then used to create cDNA. Nucleic acid sequences of the present invention were then generated using two strategies.

In the first strategy, the poly A enriched RNA was extracted from plant tissue and cDNA was made by reverse transcription PCR. The single strand cDNA was then used to create p450 specific PCR populations using degenerate primers plus a oligo d(T) reverse primer. The primer design was based on the highly conserved motifs of p450. Examples of specific degenerate primers are set forth in Figure 1. Sequence fragments from plasmids containing appropriate size inserts were further analyzed. These size inserts typically ranged from about 300 to about 800 nucleotides depending on which primers were used.

In a second strategy, a cDNA library was initially constructed. The cDNA in the plasmids was used to create p450 specific PCR populations using degenerate primers plus T7 primer on plasmid as reverse primer. As in the first strategy, sequence fragments from plasmids containing appropriate size inserts were further analyzed.

Nicotiana plant lines known to produce high levels of nornicotine (converter) and plant lines having

undetectable levels of nornicotine may be used as starting materials.

Leaves can then be removed from plants and treated with ethylene to activate p450 enzymatic activities defined herein. Total RNA is extracted using techniques known in the art. cDNA fragments can then be generated using PCR (RT-PCR) with the oligo d(T) primer as described in Figure 153. The cDNA library can then be constructed more fully described in examples herein.

The conserved region of p450 type enzymes can be used as a template for degenerate primers (Figure 75). Using degenerate primers, p450 specific bands can be amplified by PCR. Bands indicative for p450 like enzymes can be identified by DNA sequencing. PCR fragments can be characterized using BLAST search, alignment or other tools to identify appropriate candidates.

Sequence information from identified fragments can be used to develop PCR primers. These primers in combination of plasmid primers in cDNA library were used to clone full length p450 genes. Large-scale Southern reverse analysis was conducted to examine the differential expression for all fragment clones obtained and in some cases full length clones. In this aspect of the invention, these large-scale reverse Southern assays can be conducted using labeled total cDNA's from

different tissues as a probe to hybridize with cloned DNA fragments in order to screen all cloned inserts.

Nonradioactive and radioactive (P^{32}) Northern blotting assays were also used to characterize clones p450 fragments and full length clones.

Peptide specific antibodies were made against several full-length clones by deriving their amino acid sequence and selecting peptide regions that were antigenic and unique relative to other clones. Rabbit antibodies were made to synthetic peptides conjugated to a carrier protein. Western blotting analyses or other immunological methods were performed on plant tissue using these antibodies.

Nucleic acid sequences identified as described above can be examined by using virus induced gene silencing technology (VIGS, Baulcombe, Current Opinions in Plant Biology, 1999, 2:109-113).

Peptide specific antibodies were made for several full-length clones by deriving their amino acid sequence and selecting peptide regions that were potentially antigenic and were unique relative to other clones. Rabbit antibodies were made to synthetic petides conjugated to a carrier protein. Western blotting analyses were perfomed using these antibodies.

In another aspect of the invention, interfering RNA technology (RNAi) is used to further characterize cytochrome p450 enzymatic activities in Nicotiana plants of the present invention. The following references which describe this technology are incorporated by reference herein, Smith et al., Nature, 2000, 407:319-320; Fire et al., Nature, 1998, 391:306- 311; Waterhouse et al., PNAS, 1998, 95:13959-13964; Stalberg et al., Plant Molecular Biology, 1993, 23:671- 683; Baulcombe, Current Opinions in Plant Biology, 1999, 2:109-113; and Brigneti et al., EMBO Journal, 1998, 17(22):6739-6746. Plants may be transformed using RNAi techniques, antisense techniques, or a variety of other methods described.

Several techniques exist for introducing foreign genetic material into plant cells, and for obtaining plants that stably maintain and express the introduced gene. Such techniques include acceleration of genetic material coated onto microparticles directly into cells (US Patents 4,945,050 to Cornell and 5,141,131 to DowElanco). Plants may be transformed using Agrobacterium technology, see US Patent 5,177,010 to University of Toledo, 5,104,310 to Texas A&M, European Patent Application 0131624B1, European Patent Applications 120516, 159418B1, European Patent Applications 120516, 159418B1 and 176,112 to Schilperoot, US Patents 5,149,645, 5,469,976, 5,464,763 and 4,940,838 and 4,693,976 to Schilperoot, European Patent Applications 116718, 290799, 320500 all to MaxPlanck, European Patent Applications 604662 and 627752 to Japan

Nicotiana, European Patent Applications 0267159, and 0292435 and US Patent 5,231,019 all to Ciba Geigy, US Patents 5,463,174 and 4,762,785 both to Calgene, and US Patents 5,004,863 and 5,159,135 both to Agracetus. Other transformation technology includes whiskers technology, see U.S. Patents 5,302,523 and 5,464,765 both to Zeneca. Electroporation technology has also been used to transform plants, see WO 87/06614 to Boyce Thompson Institute, 5,472,869 and 5,384,253 both to Dekalb, WO9209696 and WO9321335 both to PGS. All of these transformation patents and publications are incorporated by reference. In addition to numerous technologies for transforming plants, the type of tissue which is contacted with the foreign genes may vary as well. Such tissue would include but would not be limited to embryogenic tissue, callus tissue type I and II, hypocotyl, meristem, and the like. Almost all plant tissues may be transformed during dedifferentiation using appropriate techniques within the skill of an artisan.

Foreign genetic material introduced into a plant may include a selectable marker. The preference for a particular marker is at the discretion of the artisan, but any of the following selectable markers may be used along with any other gene not listed herein which could function as a selectable marker. Such selectable markers include but are not limited to aminoglycoside phosphotransferase gene of transposon Tn5 (Aph II) which encodes resistance to the antibiotics kanamycin, neomycin and G418, as well as those genes which code for

resistance or tolerance to glyphosate; hygromycin; methotrexate; phosphinothricin (bar); imidazolinones, sulfonylureas and triazolopyrimidine herbicides, such as chlorosulfuron; bromoxynil, dalapon and the like.

In addition to a selectable marker, it may be desirous to use a reporter gene. In some instances a reporter gene may be used without a selectable marker. Reporter genes are genes which are typically not present or expressed in the recipient organism or tissue. The reporter gene typically encodes for a protein which provide for some phenotypic change or enzymatic property. Examples of such genes are provided in K. Weising et al. Ann. Rev. Genetics, 22, 421 (1988), which is incorporated herein by reference. Preferred reporter genes include without limitation glucuronidase (GUS) gene and GFP genes.

Once introduced into the plant tissue, the expression of the structural gene may be assayed by any means known to the art, and expression may be measured as mRNA transcribed, protein synthesized, or the amount of gene silencing that occurs (see U.S. Patent No. 5,583,021 which is hereby incorporated by reference). Techniques are known for the in vitro culture of plant tissue, and in a number of cases, for regeneration into whole plants (EP Appln No. 88810309.0). Procedures for transferring the introduced expression complex to commercially useful cultivars are known to those skilled in the art.

Once plant cells expressing the desired level of p450 enzyme are obtained, plant tissues and whole plants can be regenerated therefrom using methods and techniques well-known in the art. The regenerated plants are then reproduced by conventional means and the introduced genes can be transferred to other strains and cultivars by conventional plant breeding techniques.

The following examples illustrate methods for carrying out the invention and should be understood to be illustrative of, but not limiting upon, the scope of the invention which is defined in the appended claims.

EXAMPLES

EXAMPLE I: DEVELOPMENT OF PLANT TISSUE AND ETHYLENE TREATMENT

Plant Growth

Plants were seeded in pots and grown in a greenhouse for 4 weeks. The 4 week old seedlings were transplanted into individual pots and grown in the greenhouse for 2 months. The plants were watered 2 times a day with water containing 150ppm NPK fertilizer during growth. The expanded green leaves were detached from plants to do the ethylene treatment described below.

Cell Line 78379

Tobacco line 78379, which is a burley tobacco line released by the University of Kentucky was used as a source of plant material. One hundred plants were cultured as standard in the art of growing tobacco and transplanted and tagged with a distinctive number (1-100). Fertilization and field management were conducted as recommended.

Three quarters of the 100 plants converted between 20 and 100% of the nicotine to nornicotine. One quarter of the 100 plants converted less than 5% of the nicotine to nornicotine. Plant number 87 had the least conversion (2%) while plant number 21 had 100% conversion. Plants converting less than 3% were classified as non-converters. Self-pollinated seed of plant number 87 and plant number 21, as well as crossed (21 x 87 and 87 x 21) seeds were made to study genetic and phenotypic differences. Plants from selfed 21 were converters, and 99% of selfs from 87 were non-converters. The other 1% of the plants from 87 showed low conversion (5-15%). Plants from reciprocal crosses were all converters.

Cell Line 4407

Nicotiana line 4407, which is a burley line was used as a source of plant material. Uniform and representative plants (100) were selected and tagged. Of the 100 plants 97 were non-converters and three were converters. Plant number 56 had the least amount of conversion (1.2%) and plant number 58 had the highest level of conversion (96%). Self-pollenated seeds and crossed seeds were made with these two plants.

Plants from selfed-58 segregated with 3:1 converter to non-converter ratio. Plants 58-33 and 58-25, were identified as homozygous converter and nonconverter plant lines, respectively. The stable conversion of 58-33 was confirmed by analysis of its progenies of next generation.

Cell Line PBLB01

PBLB01 is a burley line developed by ProfiGen, Inc. and was used as a source of plant material. The converter plant was selected from foundation seeds of PBLB01.

Ethylene Treatment Procedures

Green leaves were detached from 2-3 month greenhouse grown plants and sprayed with 0.3% ethylene solution (Prep brand Ethephon (Rhone-Poulenc)). Each sprayed leaf

was hung in a curing rack equipped with humidifier and covered with plastic. During the treatment, the sample leaves were periodically sprayed with the ethylene solution. Approximately 24-48 hour post ethylene treatment, leaves were collected for RNA extraction. Another sub-sample was taken for metabolic constituent analysis to determine the concentration of leaf metabolites and more specific constituents of interest such as a variety of alkaloids.

As an example, alkaloids analysis could be performed as follows. Samples (0.1 g) were shaken at 150 rpm with 0.5 ml 2N NaOH, and a 5 ml extraction solution which contained quinoline as an internal standard and methyl t-butyl ether. Samples were analyzed on a HP 6890 GC equipped with a FID detector. A temperature of 250°C was used for the detector and injector. An HP column (30m-0.32nm-1·m) consisting of fused silica crosslinked with 5% phenol and 95% methyl silicon was used at a temperature gradient of 110-185 °C at 10°C per minute. The column was operated at 100°C with a flow rate of $1.7 cm^3 min^{-1}$ with a split ratio of 40:1 with a 2·1 injection volume using helium as the carrier gas.

EXAMPLE 2: RNA ISOLATION

For RNA extractions, middle leaves from 2 month old greenhouse grown plants were treated with ethylene as described. The 0 and 24-48 hours samples were used for RNA extraction. In some cases, leaf samples under the

senescence process were taken from the plants 10 days post flower-head removal. These samples were also used for extraction. Total RNA was isolated using Rneasy Plant Mini Kit® (Qiagen, Inc., Valencia, California) following manufacturer's protocol.

The tissue sample was ground under liquid nitrogen to a fine powder using a DEPC treated mortar and pestle. Approximately 100 milligrams of ground tissue were transferred to a sterile 1.5 ml eppendorf tube. This sample tube was placed in liquid nitrogen until all samples were collected. Then, 450μ-1 of Buffer RLT as provided in the kit (with the addition of Mercaptoethanol) was added to each individual tube. The sample was vortexed vigorously and incubated at 56° C for 3 minutes. The lysate was then, applied to the QIAshredder™ spin column sitting in a 2-ml collection tube, and centrifuged for 2 minutes at maximum speed. The flow through was collected and 0.5 volume of ethanol was added to the cleared lysate. The sample is mixed well and transferred to an Rneasy® mini spin column sitting in a 2 ml collection tube. The sample was centrifuged for 1 minute at 10,000rpm. Next, 700μl of buffer RW1 was pipetted onto the Rneasy® column and centrifuged for 1 minute at 10,000rpm. Buffer RPE was pipetted onto the Rneasy® column in a new collection tube and centrifuged for 1 minute at 10,000 rpm. Buffer RPE was again, added to the Rneasy® spin column and

centrifuged for 2 minutes at maximum speed to dry the membrane. To eliminate any ethanol carry over, the membrane was placed in a separate collection tube and centrifuged for an additional 1 minute at maximum speed. The Rneasy® column was transferred into a new 1.5 ml collection tube, and 40 µl of Rnase-free water was pipetted directly onto the Rneasy® membrane. This final elute tube was centrifuged for 1 minute at 10,000rpm. Quality and quantity of total RNA was analyzed by denatured formaldehyde gel and spectrophotometer.

Poly(A)RNA was isolated using Oligotex™ poly A+ RNA purification kit (Qiagen Inc.) following manufacture's protocol. About 200 µg total RNA in 250 µl maximum volume was used. A volume of 250µl of Buffer OBB and 15 µl of Oligotex™ suspension was added to the 250 µl of total RNA. The contents were mixed thoroughly by pipetting and incubated for 3 minutes at 70°C on a heating block. The sample was then, placed at room temperature for approximately 20 minutes. The oligotex:mRNA complex was pelleted by centrifugation for 2 minutes at maximum speed. All but 50 µl of the supernatant was removed from the microcentrifuge tube. The sample was treated further by OBB buffer. The oligotex:mRNA pellet was resuspended in 400 µl of Buffer OW2 by vortexing. This mix was transferred onto a small spin column placed in a new tube and centrifuged for 1 minute at maximum speed. The spin column was transferred to a new tube and an additional 400 µl of Buffer OW2 was

added to the column. The tube was then centrifuged for 1 minute at maximum speed. The spin column was transferred to a final 1.5ml microcentrifuge tube. The sample was eluted with 60 ul of hot (70°C) Buffer OEB. Poly A product was analyzed by denatured formaldehyde gels and spectrophotometric analysis.

EXAMPLE 3: REVERSE TRANSCRIPTION-PCR

First strand cDNA was produced using SuperScript reverse transcriptase following manufacturer's protocol (Invitrogen, Carlsbad, California). The poly A+ enriched RNA/oligo dT primer mix consisted of less than 5 µg of total RNA, 1 µl of 10mM dNTP mix, 1 µl of Oligo $d(T)_{12-18}$ (0.5µg/µl), and up to 10 µl of DEPC-treated water. Each sample was incubated at 65°C for 5 minutes, then placed on ice for at least 1 minute. A reaction mixture was prepared by adding each of the following components in order: 2 µl 10X RT buffer, 4 µl of 25 mM MgCl2, 2µl of 0.1 M DTT, and 1 µl of RNase OUT Recombinant RNase Inhibitor. An addition of 9 µl of reaction mixture was pipetted to each RNA/primer mixture and gently mixed. It was incubated at 42°C for 2 minutes and 1 µl of Super Script II™ RT was added to each tube. The tube was incubated for 50 minutes at 42°C. The reaction was terminated at 70° C for 15 minutes and chilled on ice. The sample was collected by centrifugation and 1 µl of RNase H was added to each tube and incubated for 20 minutes at 37°C. The second PCR was carried out with 200 pmoles of forward primer

(degenerate primers as in Figure 75, SEQ.ID Nos. 149-156) and 100 pmoles reverse primer (mix of 18nt oligo d(T) followed by 1 random base).

Reaction conditions were 94°C for 2 minutes and then performed 40 cycles of PCR at 94°C for 1 minute, 45° to 60°C for 2 minutes, 72°C for 3 minutes with a 72°C extension for an extra 10 min.

Ten microliters of the amplified sample were analyzed by electrophoresis using a 1% agarose gel. The correct size fragments were purified from agarose gel.

EXAMPLE 4: GENERATION OF PCR FRAGMENT POPULATIONS

PCR fragments from Example 3 were ligated into a pGEM-T® Easy Vector (Promega, Madison, Wisconsin) following manufacturer's instructions. The ligated product was transformed into JM109 competent cells and plated on LB media plates for blue/white selection. Colonies were selected and grown in a 96 well plate with 1.2 ml of LB media overnight at 37°C. Frozen stock was generated for all selected colonies. Plasmid DNA from plates were purified using Beckman's Biomeck 2000 miniprep robotics with Wizard SV Miniprep® kit (Promega). Plasmid DNA was eluted with 100μl water and stored in a 96 well plate. Plasmids were digested by

EcoR1 and were analyzed using 1% agarose gel to confirm the DNA quantity and size of inserts. The plasmids containing a 400-600 bp insert were sequenced using an CEQ 2000 sequencer (Beckman, Fullerton, California). The sequences were aligned with GenBank database by BLAST search. The p450 related fragments were identified and further analyzed. Alternatively, p450 fragments were isolated from substraction libraries. These fragments were also analyzed as described above.

EXAMPLE 5: CONSTRUCTION OF CDNA LIBRARY

A cDNA library was constructed by preparing total RNA from ethylene treated leaves as follows. First, total RNA was extracted from ethylene treated leaves of tobacco line 58-33 using a modified acid phenol and chloroform extraction protocol. Protocol was modified to use one gram of tissue that was ground and subsequently vortexed in 5 ml of extraction buffer (100 mM Tris-HCl, pH 8.5; 200 mM NaCl; 10mM EDTA; 0.5% SDS) to which 5 ml phenol (pH5.5) and 5 ml chloroform was added. The extracted sample was centrifuged and the supernatant was saved. This extraction step was repeated 2-3 more times until the supernatant appeared clear. Approximately 5 ml of chloroform was added to remove trace amounts of phenol. RNA was precipitated from the combined supernatant fractions by adding a 3-fold volume of ETOH and 1/10 volume of 3M NaOAc (pH5.2) and storing at -20ºC for 1 hour. After transferring to

a Corex glass container the RNA fraction was centrifuged at 9,000 RPM for 45 minutes at 4ºC. The pellet was washed with 70% ethanol and spun for 5 minutes at 9,000 RPM at 4ºC. After drying the pellet, the pelleted RNA was dissolved in 0.5 ml RNase free water. The pelleted RNA was dissolved in 0.5 ml RNase free water. The quality and quantity of total RNA was analyzed by denatured formaldehyde gel and spectrophotometer, respectively.

The resultant total RNA was isolated for poly A+ RNA using an Oligo(dT) cellulose protocol (Invitrogen) and Microcentrifuge spin columns (Invitrogen) by the following protocol. Approximately twenty mg of total RNA was subjected to twice purification to obtain high quality poly A+ RNA. Poly A+ RNA product was analyzed by performing denatured formaldehyde gel and subsequent RT-PCR of known full-length genes to ensure high quality of mRNA.

Next, poly A+ RNA was used as template to produce a cDNA library employing cDNA synthesis kit, ZAP-cDNA® synthesis kit, and ZAP-cDNA® Gigapack® III gold cloning kit (Stratagene, La Jolla, California). The method involved following the manufacture's protocol as specified. Approximately 8 μg of poly A+ RNA was used to construct cDNA library. Analysis of the primary library revealed about 2.5×10^6 - 1×10^7 pfu. A quality background test of the library was completed by

complementation assays using IPTG and X-gal, where recombinant plaques was expressed at more than 100-fold above the background reaction.

A more quantitative analysis of the library by random PCR showed that average size of insert cDNA was approximately 1.2 kb. The method used a two-step PCR method as followed. For the first step, reverse primers were designed based on the preliminary sequence information obtained from p450 fragments. The designed reverse primers and T3 (forward) primers were used amplify corresponding genes from the cDNA library. PCR reactions were subjected to agarose electrophoresis and the corresponding bands of high molecular weight were excised, purified, cloned and sequenced. In the second step, new primers designed from 5'UTR or the start coding region of p450 as the forward primers together with the reverse primers (designed from 3'UTR of p450) were used in the subsequent PCR to obtain full-length p450 clones.

The p450 fragments were generated by PCR amplification from the constructed cDNA library as described in Example 3 with the exception of the reverse primer. The T7 primer located on the plasmid downstream of cDNA inserts (see Figure 75) was used as a reverse primer. PCR fragments were isolated, cloned and sequenced as described in Example 4.

Full-length p450 genes were isolated by PCR method

from constructed cDNA library. Gene specific reverse primers (designed from the downstream sequence of p450 fragments) and a forward primer (T3 on library plasmid) were used to clone the full length genes. PCR fragments were isolated, cloned and sequenced. If necessary, second step PCR was applied. In the second step, new forward primers designed from 5'UTR of cloned p450s together with the reverse primers designed from 3'UTR of p450 clones were used in the subsequent PCR reactions to obtain full-length p450 clones. The clones were subsequently sequenced.

EXAMPLE 6: CHARACTERIZATION OF CLONED FRAGMENTS – REVERSE SOUTHERN BLOTTING ANALYSIS

Nonradioactive large scale reverse southern blotting assays were performed on all p450 clones identified in above examples to detect the differential expression. It was observed that the level of expression among different p450 clusters was very different. Further real time detection was conducted on those with high expression.

Nonradioactive Southern blotting procedures were conducted as follows.

1) Total RNA was extracted from ethylene treated and nontreated converter (58-33) and nonconverter (58-25) leaves using the Qiagen Rnaeasy kit as described in Example 2.

2) Probe was produced by biotin-tail labeling a single strand cDNA derived from poly A+ enriched RNA generated in above step. This labeled single strand cDNA was generated by RT-PCR of the converter and nonconverter total RNA (Invitrogen) as described in Example 3 with the exception of using biotinalyted oligo dT as a primer (Promega). These were used as a probe to hybridize with cloned DNA.

3) Plasmid DNA was digested with restriction enzyme EcoR1 and run on agarose gels. Gels were simultaneously dried and transferred to two nylon membranes (Biodyne B®). One membrane was hybridized with converter probe and the other with nonconverter probe. Membranes were UV-crosslinked (auto crosslink setting, 254 nm, Stratagene, Stratalinker) before hybridization.

Alternatively, the inserts were PCR amplified from each plasmid using the sequences located on both arms of p-GEM plasmid, T3 and SP6, as primers. The PCR products were analyzed by running on a 96 well Ready-to-run agarose gels. The confirmed inserts were dotted on two nylon membranes. One membrane was hybridized with converter probe and the other with nonconverter probe.

4) The membranes were hybridized and washed following manufacture's instruction with the

modification of washing stringency (Enzo MaxSence™ kit, Enzo Diagnostics, Inc, Farmingdale, NY). The membranes were prehybridized with hybridization buffer (2x SSC buffered formamide, containing detergent and hybridization enhancers) at 42°C for 30 min and hybridized with 10μl denatured probe overnight at 42°C. The membranes then were washed in 1X hybridization wash buffer 1 time at room temperature for 10 min and 4 times at 68°C for 15 min. The membranes were ready for the detection.

5) The washed membranes were detected by alkaline phosphatase labeling followed by NBT/BCIP colometric detection as described in manufacture's detection procedure (Enzo Diagnostics, Inc.). The membranes were blocked for one hour at room temperature with 1x blocking solution, washed 3 times with 1X detection reagents for 10 min, washed 2 times with 1x predevelopment reaction buffer for 5 min and then developed the blots in developing solution for 30-45 min until the dots appear. All reagents were provided by manufacture (Enzo Diagnostics, Inc). In Addition, large scale reverse Southern assay was also performed using KPL southern hybridization and detection kit™ following manfacturer's instruction(KPL, Gaithersburg, Maryland).

EXAMPLE 7: CHARACTERIZATION OF CLONES - NORTHERN BLOT ANALYSIS

Alternative to Southern Blot analysis, some membranes were hybridized and detected as described in the example of Northern blotting assays. Northern Hybridization was used to detect mRNA differentially expressed in Nicotiana as follows.

A random priming method was used to prepare probes from cloned p450 (Megaprime™ DNA Labelling Systems, Amersham Biosciences).

The following components were mixed: 25ng denatured DNA template; 4ul of each unlabeled dTTP, dGTP and dCTP; 5ul of reaction buffer; P^{32}-labelled dATP and 2ul of Klenow I; and H_2O, to bring the reaction to 50µl. The mixture was incubated in 37°C for 1-4 hours, then stopped with 2µl of 0.5 M EDTA. The probe was denatured by incubating at 95°C for 5 minutes before use.

RNA samples were prepared from ethylene treated and non-treated fresh leaves of several pairs of tobacco lines. In some cases poly A+ enriched RNA was used. Approximately 15µg total RNA or 1.8µg mRNA (methods of RNA and mRNA extraction as described in Example 5) were brought to equal volume with DEPC H_2O (5-10 µl). The same volume of loading buffer (1 x MOPS; 18.5 % Formaldehyde; 50 % Formamide; 4 %

Ficoll400; Bromophenolblue) and 0.5 µl EtBr (0.5 µg/µl) were added. The samples were subsequently denatured in preparation for separation of the RNA by electrophoresis.

Samples were subjected to electrophoresis on a formaldehyde gel (1 % Agarose, 1 x MOPS, 0.6 M Formaldehyde) with 1XMOP buffer (0.4 M Morpholinopropanesulfonic acid; 0.1 M Na-acetate-3 x H2O; 10 mM EDTA; adjust to pH 7.2 with NaOH). RNA was transferred to a Hybond-N+ membrane (Nylon, Amersham Pharmacia Biotech) by capillary method in 10 X SSC buffer (1.5 M NaCl; 0.15 M Na-citrate) for 24 hours. Membranes with RNA samples were UV-crosslinked (auto crosslink setting, 254 nm, Stratagene, Stratalinker) before hybridization.

The membrane was prehybridized for 1-4 hours at 42°C with 5-10 ml prehybridization buffer (5 x SSC; 50 % Formamide; 5 x Denhardt's-solution; 1 % SDS; 100µg/ml heat-denatured sheared non- homologous DNA). Old prehybridization buffer was discarded, and new prehybridization buffer and probe were added. The hybridization was carried out over night at 42°C. The membrane was washed for 15 minutes with 2 x SSC at room temperature, followed by a wash with 2 x SSC.

A major focus of the invention was the discovery of novel genes that may be induced as a result of ethylene treatment or play a key role in tobacco leaf quality and constituents. As illustrated in the table below, Northern blots and reverse Southern Blot were useful in determining which genes were induced by ethylene treatment relative to non-induced plants. Interestingly, not all fragments were affected similarly in the converter and nonconverter. The cytochrome p450 fragments of interest were partially sequenced to determine their structural relatedness. This information was used to subsequently isolate and characterize full length gene clones of interest.

Fragments	Induced mRNA Expression Ethylene Treatment
	Converter
D56-AC7 (SEQ ID No: 35)	+
D56-AG11 (SEQ ID No: 31)	+
D56-AC12 (SEQ ID No: 45)	+
D70A-AB5 (SEQ ID No: 95)	+
D73-AC9 (SEQ ID No: 43)	+
D70A-AA12 (SEQ ID No: 131)	+
D73A-AG3 (SEQ ID No: 129)	+
D34-52 (SEQ ID No: 61)	+
D56-AG6 (SEQ ID No: 51)	+

Northern analysis was performed using full length clones on tobacco tissue obtained from converter and nonconverter burley lines that were induced by ethylene

treatment. The purpose was to identify those full length clones that showed elevated expression in ethylene induced converter lines relative to ethylene induced converter lines relative to ethylene induced nonconverter burley lines. By so doing, the functionality relationship of full length clones may be determined by comparing biochemical differences in leaf constituents between converter and nonconverter lines. As shown in table below, six clones showed significantly higher expression, as denoted by ++ and +++, in converter ethylene treated tissue than that of nonconverter treated tissue, denoted by +. All of these clones showed little or no expression in converter and nonconverter lines that were not ethylene treated.

Full Length Clones	Converter	Nonconverter
D101-BA2	++	+
D207-AA5	++	+
D208-AC8	+++	+
D237-AD1	++	+
D89-AB1	++	+
D90A-BB3	++	+

EXAMPLE 8: IMMUNODETECTION OF p450S ENCODED BY THE CLONED GENES

Peptide regions corresponding to 20-22 amino acids in length from three p450 clones were selected for 1) having

lower or no homology to other clones and 2) having good hydrophilicity and antigenicity. The amino acid sequences of the peptide regions selected from the respective p450 clones are listed below. The synthesized peptides were conjugated with KHL and then injected into rabbits. Antisera were collected 2 and 4 weeks after the 4th injection (Alpha Diagnostic Intl. Inc. San Antonio, TX).

D234-AD1 DIDGSKSKLVKAHRKIDEILG
D90a-BB3 RDAFREKETFDENDVEELNY
D89-AB1 FKNNGDEDRHFSQKLGDLADKY

Antisera were examined for crossreactivity to target proteins from tobacco plant tissue by Western Blot analysis. Crude protein extracts were obtained from ethylene treated (0 to 40 hours) middle leaves of converter and nonconverter lines. Protein concentrations of the extracts were determined using RC DC Protein Assay Kit (BIO-RAD) following the manufacturer's protocol.

Two micrograms of protein were loaded onto each lane and the proteins separated on 10% - 20% gradient gels using the Laemmli SDS-PAGE system. The proteins were transferred from gels to PROTRAN® Nitrocellulose Transfer Membranes (Schleicher & Schuell) with the Trans-Blot® Semi-Dry cell (BIO-RAD). Target p450 proteins were detected and visualized with the ECL Advance™ Western Blotting Detection Kit (Amersham Biosciences). Primary antibodies against the synthetic-KLH conjugates were made in rabbits. Secondary antibody against rabbit IgG, coupled with peroxidase, was

purchased from Sigma. Both primary and secondary antibodies were used at 1:1000 dilutions. Antibodies showed strong reactivity to a single band on the Western Blots indicating that the antisera were monospecific to the target peptide of interest. Antisera were also crossreactive with synthetic peptides conjuated to KLH.

EXAMPLE 9: NUCLEIC ACID IDENTITY AND STRUCTURE RELATEDNESS OF ISOLATED NUCLEIC ACID FRAGMENTS

Over 100 cloned p450 fragments were sequenced in conjunction with Northern blot analysis to determine their structural relatedness. The approach used utilized forward primers based either of two common p450 motifs located near the carboxyl-terminus of the p450 genes. The forward primers corresponded to cytochrome p450 motifs FXPERF or GRRXCP(A/G) as denoted in Figure 1. The reverse primers used standard primers from either the plasmid, SP6 or T7 located on both arms of pGEM™ plasmid, or a poly A tail. The protocol used is described below.

Spectrophotometry was used to estimate the concentration of starting double stranded DNA following the manufacturer's protocol (Beckman Coulter). The template was diluted with water to the appropriate concentration, denatured by heating at 95° C for 2 minutes, and subsequently placed on ice. The sequencing reaction was prepared on ice using 0.5 to 10µl of denatured DNA template, 2 µl of 1.6 pmole of the forward primer, 8 µl of DTCS Quick Start Master Mix and the total volume brought to 20 µl with

water. The thermocycling program consisted of 30 cycles of the follow cycle: 96° C for 20 seconds, 50° C for 20 seconds, and 60° C for 4 minutes followed by holding at 4° C.

The sequence was stopped by adding 5 µl of stop buffer (equal volume of 3M NaOAc and 100mM EDTA and 1 µl of 20 mg/ml glycogen). The sample was precipitated with 60 µl of cold 95% ethanol and centrifuged at 6000g for 6 minutes. Ethanol was discarded. The pellet was 2 washes with 200 µl of cold 70% ethanol. After the pellet was dry, 40 µl of SLS solution was added and the pellet was resuspended. A layer of mineral oil was over laid. The sample was then, placed on the CEQ 8000 Automated Sequencer for further analysis.

In order to verify nucleic acid sequences, nucleic acid sequence was re-sequenced in both directions using forward primers to the FXPERF or GRRXCP(A/G) region of the p450 gene or reverse primers to either the plasmid or poly A tail. All sequencing was performed at least twice in both directions.

The nucleic acid sequences of cytochrome p450 fragments were compared to each other from the coding region corresponding to the first nucleic acid after the region encoding the GRRXCP(A/G) motif through to the stop codon. This region was selected as an indicator of genetic diversity among p450 proteins. A large number of genetically distinct p450 genes, in excess of 70 genes, were observed, similar to that of other plant species. Upon comparison of nucleic acid sequences, it was found that the

genes could be placed into distinct sequences groups based on their sequence identity. It was found that the best unique grouping of p450 members was determined to be those sequences with 75% nucleic acid identity or greater (shown in Table I). Reducing the percentage identity resulted in significantly larger groups. A preferred grouping was observed for those sequences with 81% nucleic acid identity or greater, a more preferred grouping 91% nucleic acid identity or greater, and a most preferred grouping for those sequences 99% nucleic acid identity of greater. Most of the groups contained at least two members and frequently three or more members. Others were not repeatedly discovered suggesting that approach taken was able to isolated both low and high expressing mRNA in the tissue used.

Based on 75% nucleic acid identity or greater, two cytochrome p450 groups were found to contain nucleic acid sequence identity to previously tobacco cytochrome genes that genetically distinct from that within the group. Group 23, showed nucleic acid identity, within the parameters used for Table I, to prior GenBank sequences of GI:1171579 (CAA64635) and GI:14423327 (or AAK62346) by Czernic et al and Ralston et al, respectively. GI:1171579 had nucleic acid identity to Group 23 members ranging 96.9% to 99.5% identity to members of Group 23 while GI:14423327 ranged 95.4% to 96.9% identity to this group. The members of Group 31 had nucleic acid identity ranging from 76.7% to 97.8% identity to the GenBank reported sequence of GI:14423319 (AAK62342) by Ralston et al. None of the other p450 identity groups of Table 1 contained parameter identity, as

used in Table 1, to Nicotiana p450s genes reported by Ralston et al, Czernic et al., Wang et al or LaRosa and Smigocki.

As shown in Figure 76, consensus sequence with appropriate nucleic acid degenerate probes could be derived for group to preferentially identify and isolate additional members of each group from Nicotiana plants.

Table I: Nicotiana p450 Nucleic Acid Sequence Identity Groups

GROUP	FRAGMENTS
1	D58-BG7 (SEQ ID No.:1), D58-AB1 (SEQ ID No.:3); D58-BE4 (SEQ ID No.:7)
2	D56-AH7 (SEQ ID No.:9); D13a-5 (SEQ ID No.:11)
3	D56-AG10 (SEQ ID No.:13); D35-33 (SEQ ID No.:15); D34-62 (SEQ ID No.:17)
4	D56-AA7 (SEQ ID No.:19); D56-AE1 (SEQ ID No.:21); 185-BD3 (SEQ ID No.:143)
5	D35-BB7 (SEQ ID No.:23); D177-BA7 (SEQ ID No.:25); D56A-AB6 (SEQ ID No.:27); D144-AE2 (SEQ ID No.:29)
6	D56-AG11 (SEQ ID No.:31); D179-AA1 (SEQ ID No.:33)
7	D56-AC7 (SEQ ID No.:35); D144-AD1 (SEQ ID No.:37)
8	D144-AB5 (SEQ ID No.:39)
9	D181-AB5 (SEQ ID No.:41); D73-Ac9 (SEQ ID No.:43)
10	D56-AC12 (SEQ ID No.:45)
11	D58-AB9 (SEQ ID No.:47); D56-AG9 (SEQ ID No.:49); D56-AG6 (SEQ ID No.:51); D35-BG11 (SEQ ID No.:53); D35-42 (SEQ ID No.:55); D35-BA3 (SEQ ID No.:57); D34-57 (SEQ ID No.:59); D34-52 (SEQ ID No.:61); D34-25 (SEQ ID No.:63)
12	D56-AD10 (SEQ ID No.:65)
13	56-AA11 (SEQ ID No.:67)
14	D177-BD5 (SEQ ID No.:69); D177-BD7 (SEQ ID No.:83)

15 D56A-AG10 (SEQ ID No.:71); D58-BC5 (SEQ ID No.:73); D58-AD12 (SEQ ID No.:75)

16 D56-AC11 (SEQ ID No.:77); D35-39 (SEQ ID No.:79); D58-BH4 (SEQ ID No.:81); D56-AD6 (SEQ ID No.:87)

17 D73A-AD6 (SEQ ID No.:89); D70A-BA11 (SEQ ID No.:91)

18 D70A-AB5 (SEQ ID No.:95); D70A-AA8 (SEQ ID No.:97)

19 D70A-AB8 (SEQ ID No.:99); D70A-BH2 (SEQ ID No.:101); D70A-AA4 (SEQ ID No.:103)

20 D70A-BA1 (SEQ ID No.:105); D70A-BA9 (SEQ ID No.:107)

21 D70A-BD4 (SEQ ID No.:109)

22 D181-AC5 (SEQ ID No.:111); D144-AH1 (SEQ ID No.:113); D34-65 (SEQ ID No.:115)

23 D35-BG2 (SEQ ID No.:117)

24 D73A-AH7 (SEQ ID No.:119)

25 D58-AA1 (SEQ ID No.:121); D185-BC1 (SEQ ID No.:133); D185-BG2 (SEQ ID No.:135)

26 D73-AE10 (SEQ ID No.:123)

27 D56-AC12 (SEQ ID No.:125)

28 D177-BF7 (SEQ ID No.:127); D185-BE1 (SEQ ID No.:137); D185-BD2 (SEQ ID No.:139)

29 D73A-AG3 (SEQ ID No.:129)

30 D70A-AA12 (SEQ ID No.:131); D176-BF2 (SEQ ID No.:85)

31 D176-BC3 (SEQ ID No.:145)

32 D176-BB3 (SEQ ID No.: 147)

33 D186-AH4 (SEQ ID No.:5)

EXAMPLE 10: RELATED AMINO ACID SEQUENCE IDENTITY OF ISOLATED NUCLEIC ACID FRAGMENTS

The amino acid sequences of nucleic acid sequences obtained for cytochrome p450 fragments from Example 8 were deduced. The deduced region corresponded to the amino acid immediately after the GXRXCP(A/G) sequence motif to the end of the carboxyl-terminus, or stop codon. Upon comparison of sequence identity of the fragments, a unique grouping was observed for those sequences with 70% amino acid identity or greater. A preferred grouping was observed for those sequences with 80% amino acid identity or greater, more preferred with 90% amino acid identity or greater, and a most preferred grouping for those sequences 99% amino acid identity of greater. The groups and corresponding amino acid sequences of group members are shown in Figure 2. Several of the unique nucleic acid sequences were found to have complete amino acid identity to other fragments and therefore only one member with the identical amino acid was reported.

The amino acid identity for Group 19 of Table II corresponded to three distinct groups based on their nucleic acid sequences. The amino acid sequences of each group member and their identity is shown in

Figure. 77. The amino acid differences are appropriated marked.

At least one member of each amino acid identity group was selected for gene cloning and functional studies using plants. In addition, group members that are differentially affected by ethylene treatment or other biological differences as assessed by Northern and Southern analysis were selected for gene cloning and functional studies. To assist in gene cloning, expression studies and whole plant evaluations, peptide specific antibodies will be prepared on sequence identity and differential sequence.

Table II: Nicotiana p450 Amino Acid Sequence Identity Groups

GROUP	FRAGMENTS
1	D58–BG7 (SEQ ID No.:2), D58-AB1 (SEQ ID No.:4)
2	D58-BE4 (SEQ ID No.:8)
3	D56-AH7 (SEQ ID No.:10); D13a-5 (SEQ ID No.:12)
4	D56-AG10 (SEQ ID No.:14); D34-62 (SEQ ID No.:18)
5	D56-AA7 (SEQ ID No.:20); D56-AE1 (SEQ ID No.:22); 185-BD3 (SEQ ID No.:144)
6	D35-BB7 (SEQ ID No.:24); D177-BA7 (SEQ ID No.:26); D56A-AB6 (SEQ ID No.:28); D144-AE2 (SEQ ID No.:30)
7	D56-AG11 (SEQ ID No.:32); D179-AA1 (SEQ ID No.:34)
8	D56-AC7 (SEQ ID No.:36); D144-AD1 (SEQ ID No.:38)
9	D144-AB5 (SEQ ID No.:40)
10	D181-AB5 (SEQ ID No.:42); D73-Ac9 (SEQ ID No.:44)
11	D56-AC12 (SEQ ID No.:46)
12	D58-AB9 (SEQ ID No.:48); D56-AG9 (SEQ ID No.:50); D56-AG6 (SEQ ID No.:52); D35-BG11 (SEQ ID No.:54); D35-42 (SEQ ID No.:56); D35-BA3 (SEQ ID No.:58); D34-57 (SEQ ID No.:60); D34-52 (SEQ ID No.:62)
13	D56AD10 (SEQ ID No.:66)
14	56-AA11 (SEQ ID No.:68)

15 D177-BD5 (SEQ ID No.:70); D177-BD7 (SEQ ID No.:84)

16 D56A-AG10 (SEQ ID No.:72); D58-BC5 (SEQ ID No.:74); D58-AD12 (SEQ ID No.:76)

17 D56-AC11 (SEQ ID No.:78); D56-AD6 (SEQ ID No.:88)

18 D73A-AD6 (SEQ ID No.90:)

19 D70A-AB5 (SEQ ID No.:96); D70A-AB8 (SEQ ID No.:100); D70A-BH2 (SEQ ID No.:102); D70A-AA4 (SEQ ID No.:104); D70A-BA1 (SEQ ID No.:106); D70A-BA9 (SEQ ID No.:108)

20 D70A-BD4 (SEQ ID No.:110)

21 D181-AC5 (SEQ ID No.:112); D144-AH1 (SEQ ID No.:114); D34-65 (SEQ ID No.:116)

22 D35-BG2 (SEQ ID No.:118)

23 D73A-AH7 (SEQ ID No.:120)

24 D58-AA1 (SEQ ID No.:122); D185-BC1 (SEQ ID No.:134); D185-BG2 (SEQ ID No.:136)

25 D73-AE10 (SEQ ID No.:124)

26 D56-AC12 (SEQ ID No.:126)

27 D177-BF7 (SEQ ID No.:128); 185-BD2 (SEQ ID No.:140)

28 D73A-AG3 (SEQ ID No.:130)

29 D70A-AA12 (SEQ ID No.:132); D176-BF2 (SEQ ID No.:86)

30 D176-BC3 (SEQ ID No.:146)

31 D176-BB3 (SEQ ID No.:148)

32 D186-AH4 (SEQ ID No.:6)

EXAMPLE 11: RELATED AMINO ACID SEQUENCE IDENTITY OF FULL LENGTH CLONES

The nucleic acid sequence of full length Nicotiana genes cloned in Example 5 were deduced for their entire amino acid sequence. Cytochrome p450 genes were identified by the presence of three conserved p450 domain motifs, which corresponded to UXXRXXZ, PXRFXF or GXRXC at the carboxyl-terminus where U is E or K, X is any amino acid and Z is P, T, S or M. It was also noted that two of the clones appeared nearly complete but lacked the appropriate stop codon, D130-AA1 and D101-BA2, however but both contained all three p450 cytochrome domains. All p450 genes were characterized for amino acid identity using a BLAST program comparing their full length sequences to each other and to known tobacco genes. The program used the NCBI special BLAST tool (Align two sequences (bl2seq), http://www.ncbi.nlm.nih.gov/blast/bl2seq/bl2.html). Two sequences were aligned under BLASTN without filter for nucleic acid sequences and BLASTP for amino acid sequences. Based on their percentage amino acid identity, each sequence was grouped into identity groups where the grouping contained members that shared at least 85% identity with another member. A preferred grouping was observed for those sequences with 90% amino acid identity or greater, a more preferred grouping had 95% amino acid identity or greater, and a most preferred grouping had those sequences 99% amino acid identity or greater. Using these criteria, 25 unique groups were identified and are depicted in Table III.

Within the parameters used for Table III for amino acid identity, three groups were found to contain greater than 85% or greater identity to known tobacco genes. Members of Group 5 had up to 96% amino acid identity for full length sequences to prior GenBank sequences of GI:14423327 (or AAK62346) by Ralston et al. Group 23 had up to 93% amino acid identity to GI:14423328 (or AAK62347) by Ralston et al. and Group 24 had 92% identity to GI:14423318 (or AAK62343) by Ralston et al.

Table III: Amino Acid Sequence Identity Groups of Full Length Nicotiana p450 Genes

1	D208-AD9 (SEQ. ID. No. 224); D120-AH4 (SEQ. ID. No. 180); D121-AA8 (SEQ. ID. No. 182), D122-AF10 (SEQ. ID. No. 184); D103-AH3 (SEQ. ID. No. 222); D208-AC8 (SEQ. ID. No. 218); D-235-ABI (SEQ. ID. No. 246)
2	D244-AD4 (SEQ. ID. No. 250); D244-AB6 (SEQ. ID. No. 274) ; D285-AA8; D285-AB9; D268-AE2 (SEQ. ID. No. 270)
3	D100A-AC3 (SEQ. ID. No. 168); D100A-BE2
4	D205-BE9 (SEQ. ID. No. 276); D205-BG9 (SEQ. ID. No. 202); D205-AH4 (SEQ. ID. No. 294)
5	D259-AB9 (SEQ. ID. No. 260) ; D257-AE4 (SEQ. ID. No. 268); D147-AD3 (SEQ. ID. No. 194)
6	D249-AE8 (SEQ. ID. No. 256); D-248-AA6 (SEQ. ID. No. 254)
7	D233-AG7 (SEQ. ID. No. 266; D224-BD11 (SEQ. ID. No. 240); DAF10
8	D105-AD6 (SEQ. ID. No. 172); D215-AB5 (SEQ. ID. No. 220); D135-AE1 (SEQ. ID. No. 190)

9	D87A-AF3 (SEQ. ID. No. 216), D210-BD4 (SEQ. ID. No. 262)
10	D89-AB1 (SEQ. ID. No. 150); D89-AD2 (SEQ. ID. No. 152); 163-AG11 (SEQ. ID. No. 198); 163-AF12 (SEQ. ID. No. 196)
11	D267-AF10 (SEQ. ID. No. 296); D96-AC2 (SEQ. ID. No. 160); D96-AB6 (SEQ. ID. No. 158); D207-AA5 (SEQ. ID. No. 204); D207-AB4 (SEQ. ID. No. 206); D207-AC4 (SEQ. ID. No. 208)
12	D98-AG1 (SEQ. ID. No. 164); D98-AA1 (SEQ. ID. No. 162)
13	D209-AA12 (SEQ. ID. No. 212); D209-AA11; D209-AH10 (SEQ. ID. No. 214); D209-AH12 (SEQ. ID. No. 232); D90a-BB3 (SEQ. ID. No. 154)
14	D129-AD10 (SEQ. ID. No. 188); D104A-AE8 (SEQ. ID. No. 170)
15	D228-AH8 (SEQ. ID. No. 244); D228-AD7 (SEQ. ID. No. 241), D250-AC11 (SEQ. ID. No. 258); D247-AH1 (SEQ. ID. No. 252)
16	D128-AB7 (SEQ. ID. No. 186) ; D243-AA2 (SEQ. ID. No. 248); D125-AF11 (SEQ. ID. No. 228)
17	D284-AH5 (SEQ. ID. No. 298); D110-AF12 (SEQ. ID. No. 176)
18	D221-BB8 (SEQ. ID. No. 234)
19	D222-BH4 (SEQ. ID. No. 236)
20	D134-AE11 (SEQ. ID. No. 230)
21	D109-AH8 (SEQ. ID. No. 174)
22	D136-AF4 (SEQ. ID. No. 278)
23	D237-AD1 (SEQ. ID. No. 226)
24	D112-AA5 (SEQ. ID. No. 178)
25	D283-AC1 (SEQ. ID. No. 272)

The full length genes were further grouped based on the highly conversed amino acid homology between UXXRXXXZ p450 domain and GXRXC p450 domain near the end the carboxyl-terminus. As shown in Figure 3, individual clones were aligned for their sequence homology between the conserved domains relative to each other and placed in distinct identity groups. In several cases, although the nucleic acid sequence of the clone was unique, the amino acid sequence for the region was identical. The preferred grouping was observed for those sequences with 90% amino acid identity or greater, a more preferred group had 95% amino acid identity or greater, and a most preferred grouping had those sequences 99% amino acid identity of greater. The final grouping was similar to that based on the percent identity for the entire amino acid sequence of the clones except for Group 17 (of Table III) which was divided into two distinct groups.

Within the parameters used for amino acid identity in Table IV, three groups were found to contain 90% or greater identity to known tobacco genes. Members of Group 5 had up to 93.4% amino acid identity for full length sequences to prior GenBank sequences of GI:14423326 (AAK62346) by Ralston et al. Group 23 had up to 91.8% amino acid identity to GI:14423328 (or AAK62347) by Ralston et al. and Group 24 had 98.8% identity to GI:14423318 (or AAK62342) by Ralston et al.

Table IV: Amino Acid Sequence Identity Groups of Regions between Conserved Domains of Nicotiana p450 Genes

1 1	D208-AD9 (SEQ. ID. No. 224); D120-AH4 (SEQ. ID. No. 180); D121-AA8 (SEQ. ID. No. 182), D122-AF10 (SEQ. ID. No. 184); D103-AH3 (SEQ. ID. No. 222); D208-AC8 (SEQ. ID. No. 218); D-235-ABI (SEQ. ID. No. 246)
2	D244-AD4 (SEQ. ID. No. 250); D244-AB6 (SEQ. ID. No. 274) ; D285-AA8; D285-AB9; D268-AE2 (SEQ. ID. No. 270)
3	D100A-AC3 (SEQ. ID. No. 168); D100A-BE2
4	D205-BE9 (SEQ. ID. No. 276); D205-BG9 (SEQ. ID. No. 202); D205-AH4 (SEQ. ID. No. 294)
5	D259-AB9 (SEQ. ID. No. 260) ; D257-AE4 (SEQ. ID. No. 268); D147-AD3 (SEQ. ID. No. 194)
6	D249-AE8 (SEQ. ID. No. 256); D-248-AA6 (SEQ. ID. No. 254)
7	D233-AG7 (SEQ. ID. No. 266; D224-BD11 (SEQ. ID. No. 240); DAF10
8	D105-AD6 (SEQ. ID. No. 172); D215-AB5 (SEQ. ID. No. 220); D135-AE1 (SEQ. ID. No. 190)
9	D87A-AF3 (SEQ. ID. No. 216), D210-BD4 (SEQ. ID. No. 262)
10	D89-AB1 (SEQ. ID. No. 150); D89-AD2 (SEQ. ID. No. 152); 163-AG11 (SEQ. ID. No. 198); 163-AF12 (SEQ. ID. No. 196)
11	D267-AF10 (SEQ. ID. No. 296); D96-AC2 (SEQ. ID. No. 160); D96-AB6 (SEQ. ID. No. 158); D207-AA5 (SEQ. ID. No. 204); D207-AB4 (SEQ. ID. No. 206); D207-AC4 (SEQ. ID. No. 208)
12	D98-AG1 (SEQ. ID. No. 164); D98-AA1 (SEQ. ID. No. 162)

13	D209-AA12 (SEQ. ID. No. 212); D209-AA11; D209-AH10 (SEQ. ID. No. 214); D209-AH12 (SEQ. ID. No. 232); D90a-BB3 (SEQ. ID. No. 154)
14	D129-AD10 (SEQ. ID. No. 188); D104A-AE8 (SEQ. ID. No. 170)
15	D228-AH8 (SEQ. ID. No. 244); D228-AD7 (SEQ. ID. No. 241), D250-AC11 (SEQ. ID. No. 258); D247-AH1 (SEQ. ID. No. 252)
16	D128-AB7 (SEQ. ID. No. 186) ; D243-AA2 (SEQ. ID. No. 248); D125-AF11 (SEQ. ID. No. 228)
17	D284-AH5 (SEQ. ID. No. 298); D110-AF12 (SEQ. ID. No. 176)
18	D221-BB8 (SEQ. ID. No. 234)
19	D222-BH4 (SEQ. ID. No. 236)
20	D134-AE11 (SEQ. ID. No. 230)
21	D109-AH8 (SEQ. ID. No. 174)
22	D136-AF4 (SEQ. ID. No. 278)
23	D237-AD1 (SEQ. ID. No. 226)
24	D112-AA5 (SEQ. ID. No. 178)
25	D283-AC1 (SEQ. ID. No. 272)
26	D110-AF12 (SEQ. ID. No. 176)

EXAMPLE 12: NICOTIANA CYTOCHROME P450 CLONES LACKING ONE OR MORE OF THE TOBACCO CYTOCHROME P450 SPECIFIC DOMAINS

Four clones had high nucleic acid homology, ranging 90% to 99% nucleic acid homology, to other tobacco cytochrome genes reported in Table III. The four clones included D136-AD5, D138-AD12, D243-AB3 and D250-AC11. However, due to a nucleotide frameshift these genes did not contain one or

more of three C-terminus cytochrome p450 domains and were excluded from identity groups presented in Table III or Table IV.

The amino acid identity of one clone, D95-AG1, did not contain the third domain, GXRXC, used to group p450 tobacco genes in Table III or Table IV. The nucleic acid homology of this clone had low homology to other tobacco cytochrome genes. This clone represents a novel and different group of cytochrome p450 genes in Nicotiana.

EXAMPLE 13: USE OF NICOTIANA CYTOCHROME P450 FRAGMENTS AND CLONES IN ALTERED REGULARTION OF TOBACCO PROPERTIES

The use of tobacco p450 nucleic acid fragments or whole genes are useful in identifying and selecting those plants that have altered tobacco phenotypes or tobacco constituents and, more importantly, altered metabolites. Transgenic tobacco plants are generated by a variety of transformation systems that incorporate nucleic acid fragments or full length genes, selected from those reported herein, in orientations for either down-regulation, for example anti-sense orientation, or over-expression for example, sense orienation. For over-expression to full length genes, any nucleic acid sequence that encodes the entire or a functional part or amino acide sequence of the full-length genes described in this invention are desired that are effective for increasing the expression of a certain enzyme and thus resulting in phenotypic effect within Nicotiana. Nicotiana lines that are homozygous lines are obtained

through a series of backcrossing and assessed for phenotypic changes including, but not limited to, analysis of endogenous p450 RNA, transcripts, p450 expressed peptides and concentrations of plant metabolites using techniques commonly avaiable to one having ordinary skill in the art. The changes exhibited in the tobacco plans provide information on the functional role of the selected gene of interest or are of a utility as a preffered Nicotiana plant species.

EXAMPLE 14. IDENTIFICATION OF GENES INDUCED IN ETHYLENE TREATED CONVERTER LINES

High density oligonucleotide array technology, Affymetrix GeneChip® (Affymetrix Inc., Santa Clara, CA) array, was used for quantitative and highly parallel measurements of gene expression. In using this technology, nucleic acid arrays were fabricated by direct synthesis of oligonucleotides on a solid surface. This solid-phase chemistry is able to produce arrays containing hundreds of thousands of oligonucleotide probes packed at extremely high densities on a chip referred to as GeneChip®. Thousands of genes can be simultaneously screened from a single hybridization. Each gene is typically represented by a set of 11-25 pairs of probes depending upon size. The probes are designed to maximize sensitivity, specificity, and reproducibility, allowing consistent discrimination between specific and background signals, and between closely related target sequences.

Affymetrix GeneChip hybridization experiments involve the following steps: design and production of arrays, preparation of fluorescently labeled target from RNA isolated from the biological specimens, hybridization of the labeled target to the GeneChip, screening the array, and analysis of the scanned image and generation of gene expression profiles.

A. Designing and Custom making Affymetrix GeneChip

A GeneChip CustomExpress Advantage Array was custom made by Affymetrix Inc. (Santa Clara, CA). Chip size was 18 micron and array format was 100-2187 that can accommodate 528 probe sets (11, 628 probes). Except for GenBank derived nucleic acid sequences, all sequences were selected from our previously identified tobacco clones and all probes were custom designed. A total of 400 tobacco genes or fragments were selected to be included on the GeneChip. The sequences of oligonucleotides selected were based on unique regions of the 3′ end of the gene. The selected nucleic acid sequences consisted of 56 full length p450 genes and 71 p450 fragments that were cloned from tobacco, described in (patent applications). Other tobacco sequences included 270 tobacco ESTs which were generated from suppression subtraction library using Clontech SSH kit(BD Biosciences, Palo Alto, CA). Among these genes, some oligonucleotide sequences were selected from cytochrome P450 genes listed in GenBank. Up to 25 probes were used for each full length gene and 11 probes for each fragment. A reduced number of probes were used for some clones due to the lack of unique, high

quality probes. Appropriate control sequences were also included on the GeneChip®.

-The probe Arrays were 25-mer oligonucleotides that were directly synthesized onto a glass wafer by a combination of semiconductor-based photolithography and solid phase chemical synthesis technologies. Each array contained up to 100,000 different oligonucleotide probes. Since oligonucleotide probes are synthesized in known locations on the array, the hybridization patterns and signal intensities can be interpreted in terms of gene identity and relative expression levels by the Affymetrix Microarray Suite® software. Each probe pair consists of a perfect match oligonucleotide and a mismatch oligonucleotide. The perfect match probe has a sequence exactly complimentary to the particular gene and thus measures the expression of the gene. The mismatch probe differs from the perfect match probe by a single base substitution at the center base position, which disturbs the binding of the target gene transcript. The mismatch produces a nonspecific hybridization signal or background signal that was compared to the signal measured for the perfect match oligonucleotide.

B. Sample preparation

Hybridization experiments were conducted by Genome Explorations, Inc. (Memphis, TN). The RNA samples used in hybridization consisted of six pairs of nonconverter/converter

isogenic lines that were induced by ethylene treatments. Samples included one pair of 4407-25/4407-33 non-treated burly tobacco samples, three pairs of ethylene treated 4407-25/4407-33 samples, one pair of ethylene treated dark tobacco NL Madole/181 and one pair of ethylene treated burly variety PBLB01/178. Ethylene treatment was as described in Example 1.

Total RNA was extracted from above mentioned ethylene treated and non-treated leaves using a modified acid phenol and chloroform extraction protocol. Protocol was modified to use one gram of tissue that was ground and subsequently vortexed in 5 ml of extraction buffer (100 mM Tris-HCl, pH 8.5; 200 mM NaCl; 10mM EDTA; 0.5% SDS) to which 5 ml phenol (pH5.5) and 5 ml chloroform was added. The extracted sample was centrifuged and the supernatant was saved. This extraction step was repeated 2-3 more times until the supernatant appeared clear. Approximately 5 ml of chloroform was added to remove trace amounts of phenol. RNA was precipitated from the combined supernatant fractions by adding a 3-fold volume of ETOH and 1/10 volume of 3M NaOAc (pH5.2) and storing at -20ºC for 1 hour. After transferring to a Corex glass container the RNA fraction was centrifuged at 9,000 RPM for 45 minutes at 4ºC. The pellet was washed with 70% ethanol and spun for 5 minutes at 9,000 RPM at 4ºC. After drying the pellet, the pelleted RNA was dissolved in 0.5 ml RNase free water. The pelleted RNA was dissolved in 0.5 ml RNase free water. The quality and quantity of total RNA was analyzed by denatured formaldehyde gel and spectrophotometer, respectively. The total RNA samples with 3-5µg/ul were sent to Genome explorations, inc. to do the hybridization.

C. Hybridization, detection and data output

The preparation of labeled cRNA material was performed as follows. First and second strand cDNA were synthesized from 5-15 µg of total RNA using the SuperScript Double-Stranded cDNA Synthesis Kit (Gibco Life Technologies) and oligo-dT24-T7 (5'-GGC CAG TGA ATT GTA ATA CGA CTC ACT ATA GGG AGG CGG-3') primer according to the manufacturer's instructions.

The cRNA was concurrently synthesized and labeled with biotinylated UTP and CTP by in vitro transcription using the T7 promoter coupled double stranded cDNA as template and the T7 RNA Transcript Labeling Kit (ENZO Diagnostics Inc.). Briefly, double stranded cDNA synthesized from the previous steps were washed twice with 70% ethanol and resuspended in 22 µl Rnase-free H2O. The cDNA was incubated with 4 µl of 10X each Reaction Buffer, Biotin Labeled Ribonucleotides, DTT, Rnase Inhibitor Mix and 2 µl 20X T7 RNA Polymerase for 5 hr at 37ºC. The labeled cRNA was separated from unincorporated ribonucleotides by passing through a CHROMA SPIN-100 column (Clontech) and precipitated at -20ºC for 1 hr to overnight.

Oligonucleotide array hybridization and analysis were performed as follows. The cRNA pellet was resuspended in 10 µl Rnase-free H2O and 10.0 µg was fragmented by heat and ion-mediated hydrolysis at 95ºC for 35 mins in 200 mM Tris-acetate, pH 8.1, 500 mM KOAc, 150 mM MgOAc. The fragmented cRNA was hybridized for 16hr at 45ºC to HG_U95Av2 oligonucleotide arrays (Affymetrix) containing ~12,500 full

length annotated genes together with additional probe sets designed to represent EST sequences. Arrays were washed at 25ºC with 6 X SSPE (0.9M NaCl, 60 mMNaH2PO4, 6 mM EDTA + 0.01% Tween 20) followed by a stringent wash at 50ºC with 100 mM MES, 0.1M [Na+], 0.01% Tween 20. The arrays were stained with phycoerythrein conjugated streptavidin (Molecular Probes) and the fluorescence intensities were determined using a laser confocal scanner (Hewlett-Packard). The scanned images were analyzed using Microarray software (Affymetrix). Sample loading and variations in staining were standardized by scaling the average of the fluorescent intensities of all genes on an array to constant target intensity (250) for all arrays used. Data Analysis was conducted using Microarray Suite 5.0 (Affymetrix) following user guidelines. The signal intensity for each gene was calculated as the average intensity difference, represented by [Σ(PM - MM)/(number of probe pairs)], where PM and MM denote perfect-match and mismatch probes.

D. Data Analysis and results

Twelve sets of hybridizations were successful as evidenced by the Expression Report generated using detection instruments from Genome Explorations. The main parameters on the report included Noise, Scale factor, background, total probe sets, number and percentage of present and absent probe sets, signal intensity of housekeeping controls. The data was subsequently analyzed and presented using software GCOS in combination of other Microsoft software. Signal comparison between treatment pairs was analyzed. Overall data for all

respective probes corresponding to genes and fragments of each different treatment including replications were compiled and compiled expression data such as call of the changes and signal log 2 ratio changes were analyzed.

A typical application of GeneChip technology is finding genes that are differentially expressed in different tissues. In the present application, genetic expression variations caused by ethylene treatment were determined for pairs of converter and nonconverter tobacco lines that included a 4407-25/4407-33 burley variety, PBLB01/178 burley variety, and a NL Madole/181 dark variety. These analyses detected only those genes whose expression is significantly altered due to biological variation. These analyses employed the Fold change (signal ratio) as a major criterion to identify induced genes. Other parameters, such as signal intensity, present/absent call, were also taken into consideration.

After analyzing the data for expression differences in converter and nonconverter pairs of samples for approximately 400 genes, the results based on the signal intensities showed that only two genes, D121-AA8,and D120-AH4 and one fragment, D35-BG11, that is partial fragment of D121-AA8, had reproducible induction in ethylene treated converter lines versus non-converter lines. To illustrate the differential expression of these genes, the data was represented as follows. As shown in Table V, the signal of a gene in a converter line, for example, burley tobacco variety, 4407-33, was determined as ratio to the signal of a related nonconverter isogenic line, 4407-25. Without ethylene

treatment, the ratio of converter to nonconverter signals for all genes approached 1.00. Upon ethylene treatment, two genes, D121-AA8 and D120-AH4, were induced in converter lines relative to non-converter line as determined by three independent analyses using isogenic burley lines. These genes have very high homology to each other, approximately 99.8% or greater nucleic acid sequence homology. As depicted in Table V, their relative hybridization signals in converter varieties ranged from approximately 2 to 12 fold higher in converter lines than the signals in their non-converter counterparts. In comparison, two actin-like control clones, internal controls, were found not to be induced in converter lines based on their normalized ratios. In addition, a fragment (D35-BG11), whose sequence in coding region is entirely contained in both D121-AA8 and D120-AH4 genes, was highly induced in the same samples of paired isogenic converter and nonconverter lines. Another isogenic pair of burley tobacco varieties, PBLB01 and 178, was shown to have the same genes, D121-AA8 and D120-AH4, induced in converter samples under ethylene induction. Furthermore, D121-AA8 and D120-AH4 genes were preferentially induced in converter lines of isogenic dark tobacco pairs, NL Madole and 181, demonstrating that ethylene induction of these genes in converter lines was not limited to burley tobacco varieties. In all cases, the D35-BG11 fragment was the most highly induced in converter relative to nonconverter paired lines.

Table V: A Comparison of Clone Induction in Ethylene Treated Converter and Non-Converter Lines

Clones	No Treatment	Ethylene Treated Burley Exp 1		Ethylene Treated Burley Exp 2		Ethylene Treated Burley Exp 3		Ethylene Treated Burley Exp 4		Ethylene Treated Dark	
Induced	33:25 Ratio	33:25 Ratio	Et:No* Ratio	33:25 Ratio	Et:No Ratio	33:25 Ratio	Et:No Ratio	33:25 Ratio	Et:No Ratio	181:NL Ratio	Et:No Ratio
D121-AA8	1.03	2.20	2.14	13.25	12.90	5.31	5.15	12.56	12.19	17.06	16.60
D120-AH4	1.44	2.74	1.90	18.33	12.74	4.13	2.87	10.87	7.55	11.76	8.17
Control											
Actin-Like I (5')	1.18	1.17	0.99	0.88	0.74	0.86	0.73	0.67	0.57	1.20	1.02
Actin-Like I (3')	1.09	1.23	1.12	0.89	0.81	1.18	0.11	0.86	0.79	1.02	0.93

*--normalized Ratio.

EXAMPLE 15: ETHYLENE INDUCTION OF MICROSOMAL NICOTINE DEMETHYLASE IN TOBACCO CONVERTER LINES

Biochemical analyses of demethylase enzymatic activity in microsomal enriched fractions of ethylene treated and non-treated pairs of converter and non-converter tobacco lines were performed as follows.

A. Preparation of Microsomes

Microsomes were isolated at 4°C. Tobacco leaves were extracted in a buffer consisting of 50 mM N-(2-hydrooxyethyl) piperazine-N'-(2-ethanesulfonic acid) (HEPES), pH 7.5, 3 mM DL-Dithiothreitol (DTT) and Protease Inhibitor Cocktail (Roche) at 1 tablet/50 ml. The crude extract was filtered

through four layers of cheesecloth to remove undisrupted tissue, and the filtrate was centrifuged for 20 min at 20,000 x g to remove cellular debris. The supernatant was subjected to ultracentrifugation at 100,000 x g for 60 min and the resultant pellet contained the microsomal fraction. The microsomal fraction was suspended in the extraction buffer and applied to an ultracentrifugation step where a discontinuous sucrose gradient of 0.5 M sucrose in the extraction buffer was used. The purified microsomes were resuspended in the extraction buffer supplemented with 10% (w/v) glycerol as cryoprotectant. Microsomal preparations were stored in a liquid nitrogen freezer until use.

B. Protein Concentration Determination

Microsomal proteins were precipitated with 10% Trichloroacetic Acid (TCA) (w/v) in acetone, and the protein concentrations of microsomes were determined using RC DC Protein Assay Kit (BIO-RAD) following the manufacturer's protocol.

3) Nicotine Demethylase Activity Assay

DL-Nicotine (Pyrrolidine-2-^{14}C) was obtained from Moravek Biochemicals and had a specific activity of 54 mCi/mmol. Chlorpromazine (CPZ) and oxidized cytochrome c (cyt. C), both P450 inhibitors, were purchased from Sigma. Reduced form of nicotinamide adenine dinucleotide phosphate (NADPH) is the typical electron donor for cytochrome P450 via the NADPH:cytochrome P450 reductase. NADPH was omitted for control

incubation. Routine enzyme assay consisted of microsomal proteins (around 2 mg/ml), 6 mM NADPH, 55 μM ^{14}C labeled nicotine. The concentration of CPZ and Cyt. C, when used, was 1 mM and 100 μM, respectively. The reaction was carried at 25°C for 1 hour and was stopped with addition of 300 μl methanol to each 25 μl reaction mixture. After spinning, 20 μl of the methanol extract was separated with a reverse-phase High Performance Liquid Chromatography (HPLC) system (Agilent) using an Inertsil ODS-3 3μ (150 x 4.6 mm) column from Varian. The isocratic mobile phase was the mixture of methanol and 50 mM potassium phosphate buffer, pH 6.25, with ratio of 60:40 (v/v) and the flow rate was 1 ml/min. The nornicotine peak, as determined by comparison with authentic non-labeled nornicotine, was collected and subjected to 2900 tri-carb Liquid Scintillation Counter (LSC) (Perkin Elmer) for quantification. The activity of nicotine demethylase is calculated based on the production of ^{14}C labeled nornicotine over 1 hour incubation.

Samples were obtained from pairs of Burley converter (line 4407-33) and non-converter (line 4407-25) tobacco lines that were ethylene treated or not. All untreated samples did not have any detectable microsomal nicotine demethylase activity. In contrast, microsomal samples obtained from ethylene treated converter lines were found to contain significant levels of nicotine demethylase activity. The nicotine demethylase activity was shown to be inhibited by P450 specific inhibitors demonstrating the demethylase activity was consistent to a P450 microsomal derived enzyme.

A typical set of enzyme assay results obtained for the burley converter tobacco line is shown in the Table VI. In contrast, sample derived from ethylene treated nonconverter tobacco did not contain any nicotine demethylase activity. These results demonstrated that nicotine demethylase activity was induced upon treatment with ethylene in converter lines but not in the corresponding isogenic nonconverter line. Similar results were obtained for an isogenic dark tobacco variety pair, where microsomal nicotine demethylase activity was induced in converter lines and not detectable in nonconverter paired lines. Together these experiments demonstrated that microsomal nicotine demethylase activity is induced upon ethylene treatment in converter lines while not in paired isogenic nonconverter lines. Those genes that are P450 derived genes and are preferentially induced in converter lines relative to paired non-converter lines are candidate genes to encode the nicotine demethylase enzyme.

Table VI: DEMETHYLASE ACTIVITY IN MICROSOMES OF ETHYLENE INDUCED BURLEY CONVERTER AND NON CONVERTER LINES

Sample	Microsomes	Microsomes + 1 mM chlor-promazine	Microsomes + with 100 µM cytochrome C	Microsomes - NADPH
Converter	8.3 ± 0.4 pkat / mg protein	0.01 ± 0.01 pkat / mg protein	0.2 ±0.2 pkat / mg protein	0.4 ± 0.4 pkat / mg protein
Non-Converter	Not Detected	Not Detected	Not Detected	Not Detected

EXAMPLE 16: FUNCTIONAL IDENTIFICATION OF D121-AA8 AS NICOTINE DEMETHYLASE

The function of the candidate clone (D121-AA8), was confirmed as the coding gene for nicotine demethylase, by assaying enzyme activity of heterologously expressed P450 in yeast cells.

1. Construction of Yeast Expression Vector

The putative protein-coding sequence of the P450-encoding cDNA (121AA8), was cloned into the yeast expression vector pYeDP60. Appropriate BamHI and MfeI sites (underlined) were introduced via PCR primers containing these sequences either upstream of the translation start coden (ATG) or downstream of the stop coden (TAA). The MfeI on the amplified PCR product is compatible with the EcoRI site on the vector. The primers used to amplify the 121AA8 cDNA were 5'-TAGCTACGC<u>GGATCC</u>**ATG**CTTTCTCCCATAGAAGCC-3' and 5'-CTGGATCA<u>CAATTG</u>**TTA**GTGATGGTGATGGTGATGCGATCCTCTATAAAGCTCAGGTGCCAGGC-3'. A segment of sequence coding nine extra amino acids at the C-terminus of the protein, including six histidines, was incorporated into the reverse primer. This facilitates the expression of 6 X His tagged P450 upon induction. PCR products were ligated into pYeDP60 vector after enzyme digestions in the sense orientation with reference to the GAL10-CYC1 promoter.

Constructs were verified by enzyme restrictions and DNA sequencing.

2. Yeast Transformation

The WAT11 yeast line, modified to express Arabidopsis NADPH-cytochrome P450 reductase ATR1, was transformed with the construct pYeDP60-P450 cDNA plasmids. Fifty micro-liter of WAT11 yeast cell suspension was mixed with ~1 μg plasmid DNA in a cuvette with 0.2-cm electrode gap. One pulse at 2.0 kV was applied by an Eppendorf electroporator (Model 2510). Cells were spread onto SGI plates (5 g/L bactocasamino acids, 6.7 g/L yeast nitrogen base without amino acids, 20 g/L glucose, 40 mg/L DL-tryptophan, 20 g/L agar). Transformants were confirmed by PCR analysis performed directly on randomly selected colonies.

3. P450 Expression in Transformed Yeast Cells

Single yeast colonies were used to inoculate 30 mL SGI media (5 g/L bactocasamino acids, 6.7 g/L yeast nitrogen base without amino acids, 20 g/L glucose, 40 mg/L DL-tryptophan) and grown at 30 °C for about 24 hours. An aliquot of this culture was diluted 1:50 into 1000 mL of YPGE media (10 g/L yeast extract, 20 g/L bacto peptone, 5 g/L glucose, 30 ml/L ethanol) and grown until glucose was completely consumed as indicated by the colorimetric change of a Diastix urinalysis reagent strip (Bayer, Elkhart, IN). Induction of cloned P450 was initiated by adding DL-galactose to a final concentration of 2%. The cultures were grown for an additional 20 hours

before used for *in vivo* activity assay or for microsome preparation.

WAT11 yeast cells expressing pYeDP60-CYP71D20 (a P450 catalyzing the hydroxylation of 5-*epi*-aristolochene and 1-deoxycapsidiol in *Nicotiana tabacum*) were used as control for the P450 expression and enzyme activity assays.

4. *In Vivo* Enzyme Assay

The nicotine demethylase activity in the transformed yeast cells were assayed by feeding of yeast culture with DL-Nicotine (Pyrrolidine-2-^{14}C). To 75 µl of the galactose induced culture ^{14}C labeled nicotine (54 mCi/mmol) was added to a final concentration of 55 µM. The assay culture was incubated with shaking in 14 ml polypropylene tubes for 6 hours and was extracted with 900 µl methanol. After spinning, 20 µl of the methanol extract was separated with an rp-HPLC and the nornicotine fraction was quantitated by LSC.

The control culture of WAT11 (pYeDP60-CYP71D20) did not convert nicotine to nornicotine, showing that the WAT11 yeast strain does not contain endogenous enzyme activities that can catalyze the step of nicotine bioconversion to nornicotine. In contrast, yeast expressing 121AA8 gene produced detectable amount of nornicotine, indicating the nicotine demethylase activity of this P450 enzyme.

5. Yeast Microsome Preparation

After induction by galactose for 20 hours, yeast cells were collected by centrifugation and washed twice with TES-M buffer (50 mM Tris-HCl, pH 7.5, 1 mM EDTA, o.6 M sorbitol, 10 mM 2-mercaptoethanol). The pellet was resuspended in extraction buffer (50 mM Tris-HCl, pH 7.5, 1 mM EDTA, o.6 M sorbitol, 2 mM 2-mercaptoethanol, 1% bovine serum album, Protease Inhibitor Cocktail (Roche) at 1 tablet/50 ml). Cells were then broken with glass beads (0.5 mm in diameter, Sigma). Cell extract was centrifuged for 20 min at 20,000 x g to remove cellular debris. The supernatant was subjected to ultracentrifugation at 100,000 x g for 60 min and the resultant pellet contained the microsomal fraction. The microsomal fraction was suspended in TEG-M buffer (50 mM Tris-HCl, pH 7.5, 1 mM EDTA, 20% glycerol and 1.5 mM 2-mercaptoethanol) at protein concentration of 1 mg/mL. Microsomal preparations were stored in a liquid nitrogen freezer until use.

6. Enzyme Activity Assay in Yeast Microsomal Preparations

Nicotine demethylase activity assays with yeast microsomal preparations were performed in the same way as with microsomal preparations from tobacco leaves (EXAMPLE 15) except that the protein concentrations were constant at 1 mg/mL.

Microsomal preparations from control yeast cells expressing CYP71D20 did not have any detectable microsomal nicotine demethylase activity. In contrast, microsomal samples

obtained from yeast cells expressing 121AA8 gene showed significant levels of nicotine demethylase activity. The nicotine demethylase activity had requirement for NADPH and was shown to be inhibited by P450 specific inhibitors, consistent to the P450 being investigated. A typical set of enzyme assay results obtained for the yeast cells is shown in the Table VII.

Table VII: DEMETHYLASE ACTIVITY IN MICROSOMES OF YEAST CELLS EXPRESSING 121AA8 AND CONTROL P450

Sample	Microsomes	Microsomes + 1 mM chlor-promazine	Microsomes + with 100 µM cytochrome C	Microsomes – NADPH
D121-AA8	10.8 ± 1.2* pkat / mg protein	1.4 ± 1.3 pkat / mg protein	2.4 ± 0.7 pkat / mg protein	0.4 ± 0.1 pkat / mg protein
Control (CYP71D20)	Not Detected	Not Detected	Not Detected	Not Detected

*--Average results of 3 replicates.

Together these experiments demonstrated that the cloned full length gene D121-AA8 encodes cytochrome P450 protein that catalyzes the conversion of nicotine to nornicotine when expressed in yeast.

Numerous modifications and variations in practice of the invention are expected to occur to those skilled in the art upon consideration of the foregoing detailed description of the invention. Consequently, such modifications and variations are intended to be included within the scope of the following claims.

WHAT IS CLAIMED IS:

1. An isolated nucleic acid molecule from Nicotiana, wherein said nucleic acid molecule is SEQ. ID. No.: 181.

2. An isolated nucleic acid molecule from Nicotiana, wherein said nucleic acid molecule has at least 81% sequence identity to SEQ. ID. No.: 181.

3. An isolated nucleic acid molecule from Nicotiana, wherein said nucleic acid molecule has at least 91% sequence identity to SEQ. ID. No.: 181.

4. An isolated protein from Nicotiana, wherein said protein comprises SEQ. ID. No.: 182.

5. An isolated protein from Nicotiana, wherein said protein has at least 80 percent sequence identity to SEQ. ID. No.: 182.

6. An isolated protein from Nicotiana, wherein said protein has at least 90 percent sequence identity to SEQ. ID. No.: 182.

7. A transgenic plant, wherein said transgenic plant comprises the nucleic acid molecule of claim 1, 2 or 3.

8. The transgenic plant of Claim 7, wherein said plant is a tobacco plant.

9. A method of producing a transgenic plant, wherein said method comprises the steps of:

(i) operably linking said nucleic acid molecule of claim 1,

2 or 3 with a promoter functional in said plant to create a plant transformational vector;

(ii) transforming said plant with said plant transformational vector of step (i);

(iii) selecting a plant cell transformed with said transformation vector; and

(iv) regenerating a transformation plant from said transformed plant cell.

10. The method of claim 9, wherein the plant has reduced levels of nornicotine.

11. The method of Claim 9, wherein said nucleic acid molecule is in an antisense orientation.

12. The method of Claim 9, wherein said nucleic acid molecule is in a sense orientation.

13. The method of Claim 9, wherein said nucleic acid molecule is in a RNA interference orientation.

14. The method of Claim 9, wherein said nucleic acid molecule is expressed as a double stranded RNA molecule.

15. The method of Claim 9, wherein said transgenic plant is a tobacco plant.

16. A method of selecting a plant containing a nucleic acid molecule, wherein said plant is analyzed for the presence of a nucleic acid sequence of claim 1, 2 or 3.

17. The method of selecting a plant of Claim 16, wherein said plant is analyzed by DNA hybridization.

18. The method of selecting a plant of Claim 17, wherein said DNA hybridization is Southern blot analysis.

19. The method of selecting a plant of Claim 17, wherein said DNA hybridization is Northern blot analysis.

20. The method of selecting a plant of Claim 16, wherein said plant is analyzed by PCR detection.

21. The method of Claim 16, wherein said plant is a tobacco plant.

22. A method of increasing or decreasing nornicotine levels in a plant, wherein said method comprises the steps of:

(i) operably linking said nucleic acid molecule of claim 1, 2 or 3 with a promoter functional in said plant to create a plant transformational vector;

(ii) transforming said plant with said plant transformational vector of step (i);

(iii) selecting a plant cell transformed with said transformation vector; and

(iv) regenerating a transformation plant from said transformed plant cell.

23. The method of Claim 22, wherein said nucleic acid molecule is in an antisense orientation.

24. The method of Claim 22, wherein said nucleic acid molecule is in a sense orientation.

25. The method of Claim 22, wherein said nucleic acid molecule is in a RNA interference orientation.

26. The method of Claim 22, wherein said nucleic acid molecule is expressed as a double stranded RNA molecule.

27. The method of Claim 22, wherein said transgenic plant is a tobacco plant.

28. A tobacco product having reduced amounts of nornicotine levels, the tobacco product comprising tobacco from a plant of claim 7.

29. The tobacoo product of claim 27 wherein the tobacco product is selected from the group consisting of cigarettes, cigars, pipe tobacco, snuff, chewing tobacco, products blended with the tobacco product, and mixtures thereof.

30. The tobacco product of claim 28 wherein the levels of nornicotine are reduced from about 5 to about 10%.

31. The tobacco product of claim 28 wherein the levels of nornicotine are reduced from about 10 to about 20%.

32. The tobacco product of claim 28 wherein the levels of nornicotine are reduced from about 20 to about 30%.

33. The tobacco product of claim 28 wherein the levels of nornicotine are reduced more than about 30%.

34. A tobacco leaf having reduced amounts of nornicotine levels, the tobacco leaf comprising tobacco leaf from a plant of claim 7.

31. The tobacco leaf of claim 30 wherein a tobacco product is formed from the tobacco leaf, the tobacco product selected from the group consisting of cigarettes, cigars, pipe tobacco, snuff, chewing tobacco, products blended with the tobacco product, and mixtures thereof.

32. A method of isolating a gene from a plant using the isolated nucleic acid of claim 1, 2 or 3.

FIG. 1

SEQ ID 1 D58-BG7

```
  1 GCACAACTT GCTATCAACT TGGTCACATC TATGTTGGGT
 61 CATTTGTTGC ATCATTTTAC ATGGGCTCCG GCCCCGGGGG TTAACCCGGA GGATATTGAC
121 TTGGAGGAGA GCCCTGGAAC AGTAACTTAC ATGAAAAATC CAATACAAGC TATTCCAACT
181 CCAAGATTGC CTGCACACTT GTATGGACGT GTGCCAGTGG ATATGTAA
```

SEQ ID 2

AQLAINLVTSMLGHLLHHFTWAPAPGVNPEDIDLEESPGTVTYMKNPIQAIPTPRLPAHLYGRVPVDM

FIG. 2

SEQ ID 3 D58-AB1

```
  1 GCACAACT TGCTATCAAC TTGGTCACAT CTATGTTGGG
 61 TCATTTGTTG CATCATTTTA CGTGGGCTCC GCCCCCGGGG GTTAACCCGG AGAATATTGA
121 CTTGGAGGAG AGCCCTGGAA CAGTAACTTA CATGAAAAAT CCAATACAAG CTATTCCTAC
181 TCCAAGATTG CCTGCACACT TGTATGGACG TGTGCCAGTG GATATGTAA
```

SEQ ID 4

AQLAINLVTSMLGHLLHHFTWAPPPGVNPENIDLEESPGTVTYMKNPIQAIPTPRLPAHLYGRVPVDM

FIG. 3

SEQ ID 5 D186-AH4

```
  1 ATGAATTAT TCATTGCAAG TGGAACACCT TTCAATTGCT
 61 CATATGATCC AAGGTTTCAG TTTTGCAACT ACGACCAATG AGCCTTTGGA TATGAAACAA
121 GGTGTGGGTT TAACTTTACC AAAGAAGACT GATGTTGAAG TGCTAATTAC ACCTCGCCTT
181 CCTCCTACGC TTTATCAATA TTAA
```

SEQ ID 6

MNYSLQVEHLSIAHMIQGFSFATTTNEPLDMKQGVGLTLPKKTDVEVLITPRLPPTLYQY

FIG. 4

SEQ ID 7 D58-BE4

```
  1 GCACAACTT GCTATCAACT TGGTCACATC TATGTTGGGT
 61 CATTTGTTCA TCATTTTACA TGGGCTCCGG CCCCGGGGGT TAACCCGGAG GATATTGACT
121 TGGAGGAGAG CCCTGGAACA GTAACTTACA TGA
```

SEQ ID 8

AQLAINLVTSMLGHLFIIILHGLRPRGLTRRILTWRRALEQ

FIG. 5

SEQ ID 9 D56-AH7

```
  1 GAAGGATTG GCTGTTCGAA TGGTTGCCTT GTCATTGGGA
 61 TGTATTATTC AATGTTTTGA TTGGCAACGA ATCGGCGAAG AATTGGTTGA TATGACTGAA
121 GGAACTGGAC TTACTTTGCC TAAAGCTCAA CCTTTGGTGG CCAAGTGTAG CCCACGACCT
181 AAAATGGCTA ATCTTCTCTC TCAGATTTGA
```

SEQ ID 10

EGLAVRMVALSLGCIIQCFDWQRIGEELVDMTEGTGLTLPKAQPLVAKCSPRPKMANLLSQI

FIG. 6

SEQ ID 11 D13a-5

```
  1 GAAGGATTG GCTATTCGAA TGGTTGCATT GTCATTGGGA
 61 TGTATTATTC AATGCTTTGA TTGGCAACGA CTTGGGGAAG GATTGGTTGA TAAGACTGAA
121 GGAACTGGAC TTACTTTGCC TAAAGCTCAA CCTTTAGTGG CCAAGTGTAG CCCACGACCT
181 ATAATGGCTA ATCTTCTTTC TCAGATTTGA
```

SEQ ID 12

EGLAIRMVALSLGCIIQCFDWQRLGEGLVDKTEGTGLTLPKAQPLVAKCSPRPIMANLLSQI

FIG. 7

SEQ ID 13 D56-AG10

```
  1 ATAGGTTTT GCGACTTTAG TGACACATCT GACTTTTGGT
 61 CGCTTGCTTC AAGGTTTTGA TTTTAGTAAG CCATCAAACA CGCCAATTGA CATGACAGAA
121 GGCGTAGGCG TTACTTTGCC TAAGGTTAAT CAAGTTGAAG TTCTAATTAC CCCTCGTTTA
181 CCTTCTAAGC TTTATTTATT TTGA
```

SEQ ID 14

IGFATLVTHLTFGRLLQGFDFSKPSNTPIDMTEGVGVTLPKVNQVEVLITPRLPSKLYLF

FIG. 8

SEQ ID 15 D35-33

```
  1 ATAGGCTTT GCGACTTTAG TGACACATCT GACTTTTGGT
 61 CGCTTGCTTC AAGGTTTTGA TTTTAGTAAG CCATCAAACA CGCCAATTGA CATGACAGAA
121 GGCGTAGGCG TTACTTTGCC TAAGGTTAAT CAAGTTGAAG TTCTAATTAC CCCTCGTTTA
181 CCTTCTAAGC TTTATTTAT
```

SEQ ID 16

IGFATLVTHLTFGRLLQGFDFSKPSNTPIDMTEGVGVTLPKVNQVEVLITPRLPSKLYL

FIG. 9

SEQ ID 17 D34-62

```
  1 ATAAATTTT GCGACTTTAG TGACACATCT GACTTTTGGT
 61 CGCTTGCTTC AAGGTTTTGA TTTTAGTACG CCATCAAACA CGCCAATAGA CATGACAGAA
121 GGCGTAGGCG TTACTTTGCC TAAGGTAAAT CAAGTGGAAG TTCTAATTAG CCCTCGTTTA
181 CCTTCTAAGC TTTATGTATT CTGA
```

SEQ ID 18

INFATLVTHLTFGRLLQGFDFSTPSNTPIDMTEGVGVTLPKVNQVEVLISPRLPSKLYVF

FIG. 10

SEQ ID 19 D56AA7

```
  1 ATTATACTT GCATTGCCAA TTCTTGGCAT CACTTTGGGA
 61 CGTTTGGTTC AGAACTTTGA GCTGTTGCCT CCTCCAGGCC AGTCGAAGCT CGACACCACA
121 GAGAAAGGTG GACAGTTCAG TCTCCACATT TTGAAGCATT CCACCATTGT GTTGAAACCA
181 AGGTCTTTCT GA
```

SEQ ID 20

IILALPILGITLGRLVQNFELLPPPGQSKLDTTEKGGQFSLHILKHSTIVLKPRSF

FIG. 11C

SEQ ID 21 D56-AE1

1 ATTATACTT GCATTGCCAA TTCTTGGCAT TACTTTGGGA
61 CGTTTGGTTC AGAACTTTGA GCTGTTGCCT CCTCCAGGCC AGTCGAAGCT CGACACCACA
121 GAGAAAGGTG GACAGTTCAG TCTCCATATT TTGAAGCATT CCACCATTGT GTTGAAACCA
181 AGGTCTTGCT **GA**

SEQ ID 22

IILALPILGITLGRLVQNFELLPPPGQSKLDTTEKGGQFSLHILKHSTIVLKPRSC

FIG. 12

SEQ ID 23 D35-BB7

1 TATTGCACTT GGGGTTGCAT CAATGGAACT TGCATTGTCA
61 AATCTTCTTT ATGCATTTGA TTGGGAGTTA CCTTTTGGAA TGAAAAAAGA AGACATTGAC
121 ACAAACGCCA GGCCTGGAAT TACCATGCAT AAGAAAAACG AACTTTATCT TATCCCTAAA
181 AATTATCTAT **AG**

SEQ ID 24

IALGVASMELALSNLLYAFDWELPFGMKKEDIDTNARPGITMHKKNELYLIPKNYLPSKLYLF

FIG. 13

SEQ ID 25 D177-BA7

1 ATTGCACTTG GGGTTGCATC CATGGAACTT
121 GCTTTGTCAA ATCTTCTTTA TGCATTTGAT TGGGAGTTAC CTTACGGAGT GAAAAAAGAA
181 AACATTGACA CAAATGTCAG GCCTGGAATT ACCATGCATA AGAAAAACGA ACTTTGCCTT
241 ATCCCTAGAA ATTATCTA**TA G**

SEQ ID 26

IALGVASMELALSNLLYAFDWELPYGVKKENIDTNVRPGITMHKKNELCLIPRNYL

FIG. 14

SEQ ID 27 D56A-AB6

1 GGTATTGCAC TTGGGGTTGC ATCCATGGAA CTTGCTTTGT CAAATCTTCT TTATGCATTT
61 GATTGGGAGT TGCCTTATGG AGTGAAAAAA GAAGACATCG ACACAAACGT TAGGCCTGGA
121 ATTGCCATGC ACAAGAAAAA CGAACTTTGC CTTGTCCCAA AAAATTATTT A**TAA**

SEQ ID 28

IALGVASMELALSNLLYAFDWELPYGVKKEDIDTNVRPGIAMHKKNELCLVPKNYL

FIG. 15

SEQ ID 29 D144-AE2

1 ATT GCACTTGGGG TTGCATCCAT GGAACTTGCT
61 TTGTCAAATC TTCTTTATGC ATTTGATTGG GAGTTGCCTT ATGGAGTGAA AAAAGAAGAC
121 ATCGACACAA ACGTTAGGCC TGGAATTGCC ATGCACAAGA AAAACGAACT TTGCCTTGTC
181 CCAAAAAAAT TATTTATAAA TTATATTGGG ACGTGGATCT CATGC**TAG**

SEQ ID 30

IALGVASMELALSNLLYAFDWELPYGVKKEDIDTNVRPGIAMHKKNELCLVPKKLFINYIGTWISC

FIG. 16C

SEQ ID 31 **D56-AG11**

1 ATTTCGTTT GGTTTAGCTA ATGCTTATTT GCCATTGGCT
61 CAATTACTTT ATCACTTTGA TTGGGAACTC CCCACTGGAA TCAAACCAAG CGACTTGGAC
121 TTGACTGAGT TGGTTGGAGT AACTGCCGCT AGAAAAAGTG ACCTTTACTT GGTTGCGACT
181 CCTTATCAAC CTCCTCAAAA **CTGA**

SEQ ID 32

ISFGLANAYLPLAQLLYHFDWELPTGIKPSDLDLTELVGVTAARKSDLYLVATPYQPPQN

FIG. 17

SEQ ID 33 **D179-AA1**

1 ATTTCGTTT GGCTTAGCTA ATGCTTATTT GCCATTGGCT
61 CAATTACTAT ATCACTTCGA TTGGAAACTC CCTGCTGGAA TCGAACCAAG CGACTTGGAC
121 TTGACTGAGT TGGTTGGAGT AACTGCCGCT AGAAAAAGTG ACCTTTACTT GGTTGCGACT
181 CCTTATCAAC CTCCTCAAAA **GTGA**

SEQ ID 34

ISFGLANAYLPLAQLLYHFDWKLPAGIEPSDLDLTELVGVTAARKSDLYLVATPYQPPQK

FIG. 18

SEQ ID 35 **D56-AC7**

1 ATGCTATTT GGTTTAGCTA ATGTTGGACA ACCTTTAGCT
61 CAGTTACTTT ATCACTTCGA TTGGAAACTC CCTAATGGAC AAAGTCATGA GAATTTCGAC
121 ATGACTGAGT CACCTGGAAT TTCTGCTACA AGAAAGGATG ATCTTGTTTT GATTGCCACT
181 CCTTATGATT CTTAT**TAA**TTCCAGTCTA TATCATCTAT ATGTACTCAA TAATTGTATG
361 GGA

SEQ ID 36

MLFGLANVGQPLAQLLYHFDWKLPNGQSHENFDMTESPGISATRKDDLVLIATPYDSY

FIG. 19

SEQ ID 37 **D144-AD1**

1 ATGC TATTTGGTTT AGCTAATGTT
61 GGACAACCTT TAGCTCAGTT ACTTTATCAC TTCGATTGGA AACTCCCTAA TGGACAAACT
121 CACCAAAATT TCGACATGAC TGAGTCACCT GGAATTTCTG CTACAAGAAA GGATGATCTT
181 ATTTTGATTG CCACTCCTGC TCATTCT**TGA**

SEQ ID 38

MLFGLANVGQPLAQLLYHFDWKLPNGQTHQNFDMTESPGISATRKDDLILIATPAHS

FIG. 20

SEQ ID 39 **D144-AB5**

1 TTAT TATTCGGTTT AGTTAATGTA
61 GGACATCCTT TAGCTCAATT GCTTTATCAC TTCGATTGGA AGACTCTTCC TGGGATAAGT
121 TCAGATAGTT TCGACATGAC TGAAACAGAT GGAGTAACTG CCGGAAGAAA GGATGATCTT
181 TGTTTAATTG CTACTCCTTT TGGTCTCAAT **TAA**

SEQ ID 40

LLFGLVNVGHPLAQLLYHFDWKTLPGISSDSFDMTETDGVTAGRKDDLCLIATPFGLN

FIG. 21

SEQ ID 41 **D181-AB5**

1 A TGTCGTTTGG TTTAGTTAAC ACTGGGCATC CTTTAGCTCA
61 GTTGCTCTAT TTCTTTGACT GGAAATTCCC TCATAAGGTT AATGCAGCTG ATTTTCACAC
121 TACTGAAACA AGTAGAGTTT TTGCAGCAAG CAAAGATGAC CTCTACTTGA TTCCAACAAA
181 TCACATGGAG CAAGAG**TAG**

SEQ ID 42

MSFGLVNTGHPLAQLLYFFDWKFPHKVNAADFHTTETSRVFAASKDDLYLIPTNHMEQE

FIG. 22

SEQ ID 43 **D73-AC9**

1 AT GTCGTTTGGT TTAGTTAACA CAGGGCATCC TTTAGCCCAG
121 TTGCTCTATT GCTTTGACTG GAAACTCCCT GACAAGGTTA ATGCAAATGA TTTTCGCACT
181 ACTGAAACAA GTAGAGTTTT TGCAGCAAGC AAAGATGACC TCTACTTGAT TCCCACAAAT
241 CACAGGGAGC AAGAA**TAG**

SEQ ID 44

MSFGLVNTGHPLAQLLYCFDWKLPDKVNANDFRTTETSRVFAASKDDLYLIPTNHREQE

FIG. 23

SEQ ID 45 **D56-AC12**

1 ATGCAATTT GGTTTGGCTC TTGTTACTCT GCCATTGGCT
61 CATTTGCTTC ACAATTTTGA TTGGAAACTT CCCGAAGGAA TTAATGCAAG GGATTTGGAC
121 ATGACAGAGG CAAATGGGAT ATCTGCTAGA AGAGAAAAAG ATCTTTACTT GATTGCTACT
181 CCTTATGTAT CACCTCTTGA **TTAA**

SEQ ID 46

MQFGLALVTLPLAHLLHNFDWKLPEGINARDLDMTEANGISARREKDLYLIATPYVSPLD

FIG. 24

SEQ ID 47 **D58-AB9**

1 ATGACTTAT GCATTGCAAG TGGAACACCT AACAATGGCA
61 CATTTGATCC AGGGTTTCAA TTACAGAACT CCAACTGATG AGCCCTTGGA TATGAAAGAA
121 GGTGCAGGCA TAACTATACG TAAGGTAAAT CCTGTGAAAG TGATAATTAC GCCTCGCTTG
181 GCACCTGAGC TTTAT**TAA**

SEQ ID 48

MTYALQVEHLTMAHLIQGFNYRTPTDEPLDMKEGAGITIRKVNPVKVIITPRLAPELY

FIG. 25

SEQ ID 49 **D56-AG9**

1 ATGACTTAT GCATTGCAAG TGGAACACCT AACAATGGCA
61 CATTTAATCC AGGGTTTCAA TTACAAAACT CCAAATGACG AGGCCTTGGA TATGAAGGAA
121 GGTGCAGGCA TAACTATACG TAAGGTAAAT CCTGTGGAAC TGATAATAGC GCCTCGCCTG
181 GCACCTGAGC TTTAT**TAA**

SEQ ID 50

MTYALQVEHLTMAHLIQGFNYKTPNDEALDMKEGAGITIRKVNPVELIIAPRLAPELY

FIG. 26C

SEQ ID 51 D56-AG6

```
  1 ATGACTTAT GCATTGCAAG TGGAACACCT AACAATGGCA
 61 CATTTAATCC AGGGTTTCAA TTACAAAACT CCAAATGACG AGGCCTTGGA TATGAAGGAA
121 GGTGCAGGCA TAACAATACG TAAGGTAAAT CCAGTGGAAT TGATAATAAC GCCTCGCTTG
181 GCACCTGAGC TTTACTAA
```

SEQ ID 52

MTYALQVEHLTMAHLIQGFNYKTPNDEALDMKEGAGITIRKVNPVELIITPRLAPELY

FIG. 27

SEQ ID 53 D35-BG11

```
  1 ATGACTTAT GCATTGCAAG TGGAACACTT AACAATGGCA
 61 CATTTGATCC AAGGTTTCAA TTACAGAACT CCAAATGACG AGCCCTTGGA TATGAAGGAA
121 GGTGCAGGCA TAACTATACG TAAGGTAAAT CCTGTGGAAC TGATAATAGC GCCTCGCCTG
181 GCACCTGAGC TTTATTAA
```

SEQ ID 54

MTYALQVEHLTMAHLIQGFNYRTPNDEPLDMKEGAGITIRKVNPVELIIAPRLAPELY

FIG. 28

SEQ ID 55 D35-42

```
  1 ATGACTTAT GCATTGCAAG TGGAACACTT AACAATGGCA
 61 CATTTGATCC AAGGTTTCAA TTACAGAACT CCAAATGACG AGCCCTTGGA TATGAAGGAA
121 GGTGCAGGCA TAACTATACG TAAGGTAAAT CCTGTGGAAC TGATAATAGC GCCCCTGGCA
181 CCTGAGCTTT ATTAA
```

SEQ ID 56

MTYALQVEHLTMAHLIQGFNYRTPNDEPLDMKEGAGITIRKVNPVELIIAPLAPELY

FIG. 29

SEQ ID 57 D35-BA3

```
  1 ATGACTTAT GCATTGCAAG TGGAACACTT AACAATGGCA
 61 CATTTGATCC AAGGTTTCAA TTACAGAACT CCAAATGACG AGCCCTTGGA TATGAAGGAA
121 GGTGCAGGCA TAACTATACG TAAGGTAAAT CCTGCGGAAC TGATAATAGC GCCTCGCCTG
181 GCACCTGAGC TTTATTAA
```

SEQ ID 58

MTYALQVEHLTMAHLIQGFNYRTPNDEPLDMKEGAGITIRKVNPAELIIAPRLAPELY

FIG. 30

SEQ ID 59 D34-57

```
  1 ATGACTTAT GCATTACAAG TGGAACACCT AACAATAGCA
 61 CATTTGATCC AGGGTTTCAA TTACAAAACT CCAAATGACG AGCCCTTGGA TATGAAGGAA
121 GGTGCAGGAT TAACCATACG TAAAGTAAAT CCTGTAGAAG TGACAACTAC GGCTCGCCTG
181 GCACCTGAGC TTTATTAA
```

SEQ ID 60

MTYALQVEHLTIAHLIQGFNYKTPNDEPLDMKEGAGLTIRKVNPVEVTTTARLAPELY

FIG. 31C

SEQ ID 61 D34-52

1 ATGACTTAT GCATTACAAG TGGAACACCT AACAATAGCA
61 CATTTGATCC AGGGTTTCAA TTACAAAACT CCAAATGACG AGCCCTTGGA TATGAAGGAA
121 GGTGCAGGAT TAACTATACG TAAAGTAAAT CCTGTAGAAG TGACAATTAC GGCTCGCCTG
181 GCACCTGAGC TTTAT**TAA**

SEQ ID 62

MTYALQVEHLTIAHLIQGFNYKTPNDEPLDMKEGAGLTIRKVNPVEVTITARLAPELY

FIG. 32

SEQ ID 63 D34-25

1 ATGACTTAT GCATTACAAG TGGAACACCT AACAATAGCA
61 CATTTGATCC AGGGTTTCAA TTACAAAACT CCAAATGACG AGCCCCTGGA TATGAAGGAA
121 GGTGCAGGAT TAACTATACG TAAAGTAAAT CCTGTAGAAG TGACAATTAC GGCTCGCCTG
181 GCACCTGAGC TTTAT**TAA**

SEQ ID 64

MTYALQVEHLTIAHLIQGFNYKTPNDEPLDMKEGAGLTIRKVNPVEVTITARLAPELY

FIG. 33

SEQ ID 65 D56AD10

1 TATAGCCTT GGACTTAAGG TTATCCGAGT AACATTAGCC
61 AACATGTTGC ATGGATTCAA CTGGAAATTA CCTGAAGGTA TGAAGCCAGA AGATATAAGT
121 GTGGAAGAAC ATTATGGGCT CACTACACAT CCTAAGTTTC CTGTTCCTGT GATCTTGGAA
181 TCTAGACTTT CTTCAGATCT CTATTCCCC ATCACT**TAA**

SEQ ID 66

YSLGLKVIRVTLANMLHGFNWKLPEGMKPEDISVEEHYGLTTHPKFPVPVILESRLSSDLYSPIT

FIG. 34

SEQ ID 67 D56-AA11

1 ATACAGTCTT GGGATTCGTA TAATTAGGGC AACTTTAGCT
61 AACTTGTTGC ATGGATTCAA CTGGAGATTG CCTAATGGTA TGAGTCCAGA AGACATTAGC
121 ATGGAAGAGA TTTATGGGCT AATTACACAC CCCAAAGTCG CACTTGACGT GATGATGGAG
181 CCTCGACTTC CCAACCATCT TTACAAA**TAG**

SEQ ID 68

YSLGIRIIRATLANLLHGFNWRLPNGMSPEDISMEEIYGLITHPKVALDVMMEPRLPNHLYK

FIG. 35

SEQ ID 69 D177-BD5

1 ATTAATTTTT CAATACCACT TGTTGAGCTT
121 GCACTTGCTA ATCTATTGTT TCATTATAAT TGGTCACTTC CTGAAGGGAT GCTAGCTAAG
181 GATGTTGATA TGGAAGAAGC TTTGGGGATT ACCATGCACA AGAAATCTCC CCTTTGCTTA
241 GTAGCTTCTC ATTATACTTG T**TGA**

SEQ ID 70

INFSIPLVELALANLLFHYNWSLPEGMLAKDVDMEEALGITMHKKSPLCLVASHYTC

FIG. 36C

SEQ ID 71 D56A-AG10
1 ATGCAACTTG GGCTTTATGC ATTGGAAATG GCTGTGGCCC ATCTTCTTCA TTGTTTTACT
61 TGGGAATTGC CAGATGGTAT GAAACCAAGT GAGCTTAAAA TGGATGATAT TTTTGGACTC
121 ACTGCTCCAA AAGCTAATCG ACTCGTGGCT GTGCCTACTC CACGTTTGTT GTGTCCCCTT
181 TATTAATTGA
SEQ ID 72
MQLGLYALEMAVAHLLHCFTWELPDGMKPSELKMDDIFGLTAPKANRLVAVPTPRLLCPLY

FIG. 37

SEQ ID 73 58-BC5
1 ATGCAACTT GGGCTTTATG CATTAGAAAT GGCAGTGGCC
61 CATCTTCTTC TTTGCTTTAC TTGGGAATTG CCAGATGGTA TGAAACCAAG TGAGCTTAAA
121 ATGGATGATA TTTTTGGACT CACTGCTCCA AGAGCTAATC GACTCGTGGC TGTGCCTAGT
181 CCACGTTTGT TGTGCCCACT TTATTAA
SEQ ID 74
MQLGLYALEMAVAHLLLCFTWELPDGMKPSELKMDDIFGLTAPRANRLVAVPSPRLLCPLY

FIG. 38

SEQ ID 75 D58-AD12
1 ATGCAACTT GGGCTTTATG CATTGGAAAT GGCTGTGGCC
61 CATCTTCTTC ATTGTTTTAC TTGGGAATTG CCAGATGGTA TGAAACCAAG TGAGCTTAAA
121 ATGGATGATA TTTTTGGACT CACTGCTCCA AGAGCTAATC GACTCGTGGC TGTGCCTACT
181 CCACGTTTGT TGTGTCCCCT TTATTAA
SEQ ID 76
MQLGLYALEMAVAHLLHCFTWELPDGMKPSELKMDDIFGLTAPRANRLVAVPTPRLLCPLY

FIG. 39

SEQ ID 77 D56-AC11
1 ATGCTTTGG AGTGCGAGTA TAGTGCGCGT CAGCTACCTA
61 ACTTGTATTT ATAGATTCCA AGTATATGCT GGGTCTGTGT TCAGAGTAGC ATGA
SEQ ID 78
MLWSASIVRVSYLTCIYRFQVYAGSVFRVA

FIG. 40

SEQ ID 79 D35-39
1 ATGCTTTGG AGTGCGAGTA TAGTGCGCGT CAGCTACCTA
61 ACTTGTATTT ATAGATTCCA AGTATATGCT GGGTCTGTGT TCAGAGTAGC ATGA
SEQ ID 80
MLWSASIVRVSYLTCIYRFQVYAGSVFRVA

SEQ ID 81 D58-BH4

1 ATGCTTTGG AGTGCGAGTA TAGTGCGCGT CAGCTACCTA
61 ACCTGTATTT ATAGATTCCA AGTATATGCT GGGTCTGTGT TCAGAGTAGC **ATGA**

SEQ ID 82
MLWSASIVRVSYLTCIYRFQVYAGSVFRVA

FIG. 42

SEQ ID 83 D177-BD7

1 ATTAATTTTT CAATACCACT TGTTGAGCTT GCACTTGCTA ATCTATTGTT TCATTATAAT
61 TGGTCACTTC CTGAGGGGAT GCTACCTAAG GATGTTGATA TGGAAGAAGC TTTGGGGATT
121 ACCATGCACA AGAAATCTCC CCTTTGCTTA GTAGCTTCTC ATTATAACTT GTT**GTGA**

SEQ ID 84
INFSIPLVELALANLLFHYNWSLPEGMLPKDVDMEEALGITMHKKSPLCLVASHYNLL

FIG. 43

SEQ ID 85

D176-BF2

1 AT ATCATTTGGT TTGGCTAATG TTTATTTGCC ACTAGCTCAA
121 TTGTTATATC ATTTTGATTG GAAACTCCCT ACTGGAATCA ATTCAAGTGA CTTGGACATG
181 ACTGAGTCGT CAGGAGTAAC TTGTGCTAGA AAGAGTGATT TATACTTGAC TGCTACTCCA
241 TATCAACTTT CTCAAGAG**TG A**

SEQ ID 86
GISFGLANVYLPLAQLLYHFDWKLPTGINSSDLDMTESSGVTCARKSDLYLTATPYQLSQE

FIG. 44

SEQ ID 87 D56-AD6

1 ATGCTTTGG AGTGCGAGTA TAGTGCGCGT CAGCTACCTA
61 ACTTGTATTT ATAGATTCCA AGTATATGCT GGGTCTGTGT CCAGAGTAGC **ATGA**

SEQ ID 88
MLWSASIVRVSYLTCIYRFQVYAGSVSRVA

FIG. 45

SEQ ID 89 D73A-AD6

1 CT GAATTTTGCA ATGTTAGAGG CAAAAATGGC ACTTGCATTG
121 ATTCTACAAC ACTATGCTTT TGAGCTCTCT CCATCTTATG CACATGCTCC TCATACAATT
181 ATCACTCTGC AACCTCAACA TGGTGCTCCT TTGATTTTGC GCAAGCTG**TA G**

SEQ ID 90
LNFAMLEAKMALALILQHYAFELSPSYAHAPHTIITLQPQHGAPLILRKL

FIG. 46

SEQ ID 91 D70A-BA11

1 CT GAATTTTGCA ATGTTAGAGG CAAAAATGGC ACTTGCATTG
121 ATTCTACAAC ACTATGCTTT TGAGCTCTCT CCATCTTATG CACACGCTCC TCATACAATT
181 ATCACTCTGC AACCTCAACA TGGTGCTCCT TTGATTTTGC GCAAGCTGTA G

SEQ ID 92

LNFAMLEAKMALALILQHYAFELSPSYAHAPHTIITLQPQHGAPLILRKL

FIG. 47

SEQ ID 93 D70A-BB5

1 AA TAATTTTGCA ATGTTGGAAA CTAAGATTGC CTTAGCAATG
121 ATCCTACAGC GTTTTGCTTT CGAGCTTTCT CCATCTTACG CTCATGCACC TACTTATGTC
181 GTCACTCTTC GACCTCAGTG TGGTGCTCAC TTAATCTTGC AAAAATTATA GGTCCTTAAT
241 CTGGATTTCC CATTATTGAG TAGTGCCTAA TAAATCTTCT CTATCACTAT TTTTCCATCT
301 TTCA

SEQ ID 94

NNFAMLETKIALAMILQRFAFELSPSYAHAPTYVVTLRPQCGAHLILQKL

FIG. 48

SEQ ID 95 D70A-AB5

1 AGCGAAGGGG TGGCAAAGGC AACAAAGGGG AAAATGACAT ATTTTCCATT TGGTGCAGGA
61 CCGCGAAAAT GCATTGGGCA AAACTTCGCG ATTTTGGAAG CAAAAATGGC TATAGCTATG
121 ATTCTACAAC GCTTCTCCTT CGAGCTCTCC CCATCTTATA CACACTCTCC ATACACTGTG
181 GTCACTTTGA AACCCAAATA TGGTGCTCCC CTAATAATGC ACAGGCTGTA GTCCTGTGAG
241 AATATGCTAT CCGAGGAATT CAGTTCCT

SEQ ID 96

QNFAILEAKMAIAMILQRFSFELSPSYTHSPYTVVTLKPKYGAPLIMHRL

FIG. 49

SEQ ID 97 D70A-AA8

1 AGCGAAGGGG TGGCAAAGGC AACAAAGGGG AAAATGACAT ATTTTCCATT TGGTGCAGGA
61 CCGCGAAAAT GCATTGGGCA AAACTTCGCG ATTTTGGAAG CAAAAATGGC TATAGCTATG
121 ATTCTACAAC GCTTCTCCTT CGAGCTCTCT CCATCTTATA CACACTCTCC ATACACTGTG
181 GTCACTTTGA AACCCAAATA TGGTGCTCCC CTAATAATGC ACAGGCTGTA GTCCTGT

SEQ ID 98

QNFAILEAKMAIAMILQRFSFELSPSYTHSPYTVVTLKPKYGAPLIMHRL

FIG. 50

SEQ ID 99 D70A-AB8

1 C AAAATTTTGC CATGTTAGAA GCAAAGATGG CTCTGTCTAT GATCCTGCAA
121 CGCTTCTCTT TTGAACTGTC TCCGTCTTAT GCACATGCCC CTCAGTCCAT ATTAACCGT
181 CAGCCACAAT ATGGTGCTCC ACTTTATTTC CACAAGCTAT AA

SEQ ID 100

QNFAMLEAKMALSMILQRFSFELSPSYAHAPQSILTVQPQYGAPLIFHKL

FIG. 51

SEQ ID 101 D70A-BH2

1 AT AAACTTTGCA ATGACAGAAG CGAAGATGGC TATGGCTATG
121 ATTCTGCAAC GCTTCTCCTT TGAGCTATCT CCATCTTACA CACATGCTCC ACAGTCTGTA
181 ATAACTATGC AACCCCAATA TGGTGCTCCT CTTATATTGC ACAAATTGTA A

SEQ ID 102

INFAMTEAKMAMAMILQRFSFELSPSYTHAPQSVITMQPQYGAPLILHKL

FIG. 52

SEQ ID 103 D70A-AA4

1 AT AAACTTTGCA ATGGCAGAAG CGAAGATGGC TATGGCTATG
121 ATTCTGCAAC GCTTCTCCTT TGAGCTATCT CCATCTTACA CACATGCTCC ACAGTCTGTA
181 ATAACTATGC AACCCCAATA TGGTGCTCCT CTTATATTGC ACAAATTGTA A

SEQ ID 104

INFAMAEAKMAMAMILQRFSFELSPSYTHAPQSVITMQPQYGAPLILHKL

FIG. 53

SEQ ID 105 D70A-BA1

1 CA AAACTTTGCA ATGATGGAAG CAAAAATGGC AGTAGCTATG
121 ATACTACAAA AATTTTCCTT TGAACTATCC CCTTCTTATA CACATGCTCC ATTTGCAATT
181 GTGACTATTC ATCCTCAGTA TGGTGCTCCT CTGCTTATGC GCAGACTTTA A

SEQ ID 106

QNFAMMEAKMAVAMILQKFSFELSPSYTHAPFAIVTIHPQYGAPLLMRRL

FIG. 54

SEQ ID 107 D70A-BA9

1 CA AAACTTTGCA ATGATGGAAG CAAAAATGGC AGTAGCTATG
121 ATACTACATA AATTTTCCTT TGAACTATCC CCTTCTTATA CACATGCTCC ATTTGCAATT
181 GTGACTATTC ATCCTCAGTA TGGTGCTCCT CTGCTTATGC GCAGACTTTA A

SEQ ID 108

QNFAMMEAKMAVAMILHKFSFELPSYTHAPFAIVTIHPQYGAPLLMRRL

FIG. 55

SEQ ID 109 D70A-BD4

1 CA AAATTTTGCT ATGTTAGAGG CTAAAATGGC AATGGCTATG
121 ATTCTGAAAA CCTATGCATT TGAACTCTCT CCATCTTATG CTCATGCTCC TCATCCACTA
181 CTACTTCAAC CTCAATATGG TGCTCAATTA ATTTTGTACA AGTTGTAG

SEQ ID 110

QNFAMLEAKMAMAMILKTYAFELSPSYAHAPHPLLLQPQYGAQLILYKL

FIG. 56C

SEQ ID 111 **D181-AC5**

1 TATAGCATGG GGCTCAAGGC GATTCAAGCT AGCTTAGCTA
61 ATCTTCTACA TGGATTTAAC TGGTCATTGC CTGATAATAT GACTCCTGAG GACCTCAACA
121 TGGATGAGAT TTTTGGGCTC TCTACACCTA AAAAATTTCC ACTTGCTACT GTGATTGAGC
181 CAAGACTTTC ACCAAAACTT TACTCTGTTT **GA**

SEQ ID 112

YSMGLKAIQASLANLLHGFNWSLPDNMTPEDLNMDEIFGLSTPKKFPLATVIEPRLSPKLYSV

FIG. 57

SEQ ID 113 **D144-AH1**

1 TAT AGCTTGGGGC TCAAGGAGAT TCAAGCTAGC
61 TTAGCTAATC TTCTACATGG ATTTAACTGG TCATTGCCTG ATAATATGAC TCCTGAGGAC
121 CTCAACATGG ATGAGATTTT TGGGCTCTCT ACACCTAAAA AATTTCCACT TGCTACTGTG
181 ATTGAGCCAA GACTTTCACC AAAACTTTAC TCTGTT**TGA**

SEQ ID 114

YSLGLKEIQASLANLLHGFNWSLPDNMTPEDLNMDEIFGLSTPKKFPLATVIEPRLSPKLYSV

FIG. 58

SEQ ID 115 **D34-65**

1 CATAGCTTG GGGCTCAAGG TGATTCAAGC TAGCTTAGCT
61 AATCTTCTAC ATGGATTTAA CTGGTCATTG CCTGATAATA TGACTCCTGA GGACCTCAAC
121 ATGGATGAGA TTTTTGGGCT CTCTACACCT AAAAAATTTC CACTTGCTAC TGTGATTGAG
181 CCAAGACTTT CACCAAAACT TTACTCTGTT **TGA**

SEQ ID 116

HSLGLKVIQASLANLLHGFNWSLPDNMTPEDLNMDEIFGLSTPKKFPLATVIEPRLSPKLYSV

FIG. 59

SEQ ID 117 **D35-BG2**

1 CTGTGCTTT CCATGTTTAA TCTCTAGTTA TATACTGGCT
61 TTGAATGTGA ATCTGTATCA TAATTTCTTG CAAATTTCTC CTTCCATTTC TTAT**TAA**

SEQ ID 118

LCFPCLISSYILALNVNLYHNFLQISPSISY

FIG. 60

SEQ ID 119 **D73A-AH7**

1 TCTG GACTTGCTCA ATGTGTGGTT GGTTTAGCTT TAGCAACTCT AGTGCAGTGT
121 TTTGAGTGGA AAAGGGTAAG CGAAGAGGTG GTTGATTTGA CGGAAGGAAA AGGTCTCACT
181 ATGCCAAAAC CCGAGCCACT CATGGCTAGG TGCGAAGCTC GTGACATTTT TCACAAAGTT
241 CTTTCAGAAA TATCT**TAA**

SEQ ID 120

SGLAQCVVGLALATLVQCFEWKRVSEEVVDLTEGKGLTMPKPEPLMARCEARDIFHKVLSEIS

FIG. 61

SEQ ID 121 **D58-AA1**

1 TTGGGCTTG GCAACGGTGC ATGTGAATTT GATGTTGGCC
61 CGAATGATTC AAGAATTTGA ATGGTCCGCT TACCCGGAAA ATAGGAAAGT GGATTTTACT
121 GAGAAATTGG AATTTACTGT GGTGATGAAA AATCCTTTAA GAGCTAAGGT CAAGCCAAGA
181 ATGCAAGTGG TG**TAA**

SEQ ID 122

LGLATVHVNLMLARMIQEFEWSAYPENRKVDFTEKLEFTVVMKNPLRAKVKPRMQVV

FIG. 62

SEQ ID 123 **D73A-AE10**

1 TATGCTT TGGCTATGCT TCATTTAGAG
121 TACTTTGTGG CTAATTTGGT TTGGCATTTT CGATGGGAGG CTGTGGAGGG AGATGATGTT
181 GATCTTTCAG AAAAGCTAGA ATTCACCGTT GTGATGAAGA ATCCACTTCG AGCTCGTATC
241 TGCCCCAGAG TTAACTCTAT **TTGA**

SEQ ID 124

YALAMLHLEYFVANLVWHFRWEAVEGDDVDLSEKLEFTVVMKNPLRARICPRVNSI

FIG. 63

SEQ ID 125 **D56A-AC12**

1 GGTCAGCAAG TTGGACTTCT TAGAACAACC ATTTTCATCG CCTCATTACT GTCTGAATAT
61 AAGCTGAAAC CTCGCTCACA CCAGAAACAA GTTGAACTCA CCGATTTAAA TCCAGCAAGT
121 TGGCTTCATT CGATAAAAGG CGAACTGTTA GTCGATGCGA TTCCTCGAAA GAAGGCGGCA
181 TTT**TAA**

SEQ ID 126

GQQVGLLRTTIFIASLLSEYKLKPRSHQKQVELTDLNPASWLHSIKGELLVDAIPRKKAAF

FIG. 64

SEQ ID 127 **D177-BF7**

1 ATCACATTTG CTAAGTTTGT GAATGAGCTA
121 GCATTGGCAA GATTAATGTT CCATTTTGAT TTCTCGCTAC CAAAAGGAGT TAAGCATGAG
181 GATTTGGACG TGGAGGAAGC TGCTGGAATT ACTGTTAGAA GGAAGTTCCC CCTTTTAGCC
241 GTCGCCACTC CATGCTCG**TG A**

SEQ ID 128

ITFAKFVNELALARLMFHFDFSLPKGVKHEDLDVEEAAGITVRRKFPLLAVATPCS

FIG. 65

SEQ ID 129 **D73A-AG3**

1 CA GAGGTATGCT ATAAACCATT TGATGCTCTT TATTGCGTTG
121 TTCACGGCTC TGATTGATTT CAAGAGGCAC AAAACGGACG GCTGTGATGA TATCGCGTAT
181 ATTCCAACCA TTGCTCCAAA GGATGATTGT AAAGTGTTCC TTTCACAGAG GTGCACTCGA
241 TTCCCATCTT TTTCA**TGA**

SEQ ID 130

QRYAINHLMLFIALFTALIDFKRHKTDGCDDIAYIPTIAPKDDCKVFLSQRCTRFPSFS

FIG. 66

SEQ ID 131 **D70A-AA12**

```
  1 ATG TCATTTGGTT TAGCTAATCT TTACTTACCA TTGGCTCAAT
121 TACTCTATCA CTTTGACTGG AAACTCCCAA CCGGAATCAA GCCAAGAGAC TTGGACTTGA
181 CCGAATTATC GGGAATAACT ATTGCTAGAA AGGGTGACCT TTACTTAAAT GCTACTCCTT
241 ATCAACCTTC TCGAGAGTAA
```

SEQ ID 132

MSFGLANLYLPLAQLLYHFDWKLPTGIKPRDLDLTELSGITIARKGDLYLNATPYQPSRE

FIG. 67

SEQ ID 133 **D185-BC1**

```
  1 TTGGGCTTG GCAACGGTGC ATGTGAATTT GATGTTGGCC
 61 CGAACGATTC AAGAATTTGA ATGGTCCGCT TACCCGGAAA ATAGGAAAGT GGATTTtACT
121 GAGAAATTGG AATTTACTGT GGTGATGAAA AACCCTTTAA GAGCTAAGGT CAAGCCAAGA
181 ATGCAAGTGG TGTAA
```

SEQ ID 134

LGLATVHVNLMLARTIQEFEWSAYPENRKVDFTEKLEFTVVMKNPLRAKVKPRMQVV

FIG. 68

SEQ ID 135 **D185-BG2**

```
  1 TTGGGCTTG GCAACGGTGC ATGTGAATTT GATGTTGGCC
 61 CGAATGATTC AAGAATTTGA ATGGTCCGCT TACCCGGAAA ATAGGAAAGT GGATTTACTG
121 AGAAATTGGA ATTTACTGTG GTGA
```

SEQ ID 136

LGLATVHVNLMLARMIQEFEWSAYPENRKVDLLRNWNLLW

FIG. 69

SEQ ID 137 **D185-BE1**

```
  1 ATCACATTT GCTAAGTTTG TGAATGAGCT AGCATTGGCA
 61 AGATTAATGT TCCATTTTGA TTTCTCGCTA CCAAAAGGAG TTAAGCATGA GGATTTGGAC
121 GTGGAGGAAG CTGCTGGAAT TACTGTTAGG AGGAAGTTCC CCTTTTAGC CGTCGCCACT
181 CCATGCTCGT GA
```

SEQ ID 138

ITFAKFVNELALARLMFHFDFSLPKGVKHEDLDVEEAAGITVRRKFPLLAVATPCS

FIG. 70

SEQ ID 139 **D185-BD2**

```
  1 ATCACATTT GCTAAGTTTG TGAATGAGCT AGCATTGGCA
 61 AGATTAATGT TCCATTTTGA TTTCTCGCTA CCAAAAGGAG TTAAGCATGC GGATTTGGAC
121 GTGGAGGAAG CTGCTGGAAT TACTGTTAGA AGGAAGTTCC CCTTTTAGC CGTCGCCACT
181 CCATGCTCGT GA
```

SEQ ID 140

ITFAKFVNELALARLMFHFDFSLPKGVKHADLDVEEAAGITVRRKFPLLAVATPCS

FIG. 71C

SEQ ID 141 **D176-BG2**
1 CA AAATTTTGCC ATGTTAGAAG CAAAGACTAC TTTGGCTATG
121 ATCCTACAAC GCTTCTCCTT TGAACTGTCT CCATCTTATG CACATGCTCC TCAGTCCATA
181 ATAACTTTGC AACCCCAGTA TGGTGCTCCA CTTATTTTGC ATAAAATATA G
SEQ ID 142
QNFAMLEAKTTLAMILQRFSFELSPSYAHAPQSIITLQPQYGAPLILHKI

FIG. 72

SEQ ID 143 **D185-BD3**
1 ATTATCCTT GCACTGCCAA TTCTTGGCAT TACCTTGGGA
61 CGCTTGGTGC AGAACTTTGA GTTGTTGCCT CCTCCAGGAC AGTCAAAGCT TGACACAACA
121 GAGAAAGGCG GGCAATTCAG TCTGCACATT TTGAAGCATT CCACCATTGT GATGAAACCA
181 AGATCTTTTT AA
SEQ ID 144
IILALPILGITLGRLVQNFELLPPPGQSKLDTTEKGGQFSLHILKHSTIVMKPRSF

FIG. 73

SEQ ID 145 **D176-BC3**
1 C AAAATTTTGC CATGTTAGAA GCAAAGACTA CTTTGGCTAT
121 GATCCTACAA CGCTTCTCCT TTGAACTGTC TCCATCTTAT GCACATGCTC CTCAGTCCAT
181 AATAACTTGC AACCCCAGTA TGGTGCTCCA CTTATTTTGC ATAAAATATA GTTTATTACT
241 TGTAAGTAGT GTCTCGTTTT ATGTTAAGCA TGAGTCCAAA ATGTTAAGGC TTGTAGAACT
301 GCAAAATGGG AATGCATTTG CACTCGTGCA CTGTAGATTG TTGTAA
SEQ ID 146
QNFAMLEAKTTLAMILQRFSFELSPSYAHAPQSIITCNPSMVLHLFCIKYSLLLVSSVSFYVKHESKMLRLVELQNGNA
FALVHCRLL

FIG. 74

SEQ ID 147 **D176-BB3**
1 GCTGAT
61 ATGGGGTTGC GAGCAGTTTC TTTGGCATTA GGTGCACTTA TTCAATGCTT TGACTGGCAA
121 ATTGAGGAAG CGGAAAGCTT GGAGGAAAGC TATAATTCTA GAATGACTAT GCAGAACAAG
181 CCTTTGAAGG TTGTCTGCAC TCCACGCGAA GATCTTGGCC AGCTTCTATC CCAACTCTAA
SEQ ID 148
ADMGLRAVSLALGALIQCFDWQIEEAESLEESYNSRMTMQNKPLKVVCTPREDLGQLLSQL

FIG. 75

NAME D89-AB1
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 149

```
   1 CTTCCTTCCT AAGTCCTAAC TAAAAATGGA GATTCAGTTT TCTAACTTAG TTGCATTCTT
  61 GCTCTTTCTC TCCAGCATCT TTCTTCTATT CAAAAAATGG AAAACCAGAA AACTAAATTT
 121 GCCTCCTGGT CCATGGAAAT TACCTTTTAT TGGAAGTTTA CACCATTTGG CTGTGGCAGG
 181 TCCACTTCCT CACCATGGCC TAAAAAATTT AGCCAAACGC TATGGTCCTC TTATGCATTT
 241 ACAACTTGGA CAAATTCCTA CACTCATCAT ATCATCACCT CAAATGGCAA AAGAAGTACT
 301 AAAAACTCAC GACCTCGCTT TTGCCACTAG ACCAAAGCTT GTCGCGGCCG ACATCATTCA
 361 CTACGACAGC ACGGACATAG CATTTTCTCC GTACGGTGAA TACTGGAGAC AAATTCGTAA
 421 AATTTGCATA TTGGAACTCT TGAGTGCCAA GATGGTCAAA TTTTTTAGCT CGATTCGCCA
 481 AGATGAGCTC TCGAAGATGC TCTCATCTAT ACGAACGACA CCCAATCTTA CAGTCAATCT
 541 TACTGACAAA ATTTTTTGGT TTACGAGTTC GGTAACTTGT AGATCAGCTT TAGGGAAGAT
 601 ATGTGGTGAC CAAGACAAAT TGATCATTTT TATGAGGGAA ATAATATCAT TGGCAGGTGG
 661 ATTTAGTATT GCTGATTTTT TCCCTACATG GAAAATGATT CATGATATTG ATGGTTCGAA
 721 ATCTAAACTG GTGAAAGCAC ATCGTAAGAT TGATGAAATT TTGGGAAATG TTGTTGATGA
 781 GCACAAAAAG AACAGAGCAG ATGGCAAGAA GGGTAATGGT GAATTTGGTG GTGAAGATTT
 841 GATTGATGTA TTGTTAAGAG TTAGAGAAAG TGGAGAAGTT CAAATTCCTA TCACAAATGA
 901 CAATATCAAA TCAATATTAA TCGACATGTT CTCTGCAGGA TCTGAAACAT CATCGACGAC
 961 TATAATTTGG GCATTAGCTG AAATGATGAA GAAACCAAGT GTTTTAGCAA AGGCACAAGC
1021 TGAAGTAAGG CAAGCTTTGA AGGAGAAAAA AGGTTTTCAA CAGATTGATC TTGATGAGCT
1081 AAAATATCTC AAGTTAGTAA TCAAAGAAAC CTTAAGAATG CACCCTCCAA TTCCTCTATT
1141 AGTTCCTAGA GAATGTATGG AGGATACAAA GATTGATGGT TACAATATAC CTTTCAAAAC
1201 AAGAGTCATA GTTAATGCAT GGGCAATCGG ACGAGATCCA GAAAGTTGGG ATGACCCCGA
1261 AAGCTTTATG CCAGAGAGAT TTGAGAATAG TTCTATTGAC TTTCTTGGAA ATCATCATCA
1321 GTTTATACCA TTTGGTGCAG GAAGAAGGAT TTGTCCGGGA ATGCTATTTG GTTTAGCTAA
1381 TGTTGGACAA CCTTTAGCTC AGTTACTTTA TCACTTCGAT TGGAAACTCC CTAATGGACA
1441 AAGTCATGAG AATTTCGACA TGACTGAGTC ACCTGGAATT TCTGCTACAA GAAAGGATGA
1501 TCTTGTTTTG ATTGCCACTC CTTATGATTC TTATTAAGCA GTAGCAGAAA TAAAAAGCCG
1561 GGGCAAACAG AAAAAA
```

SEQ. ID. NO. 150

```
  1 MEIQFSNLVA FLLFLSSIFL LFKKWKTRKL NLPPGPWKLP FIGSLHHLAV AGPLPHHGLK
 61 NLAKRYGPLM HLQLGQIPTL IISSPQMAKE VLKTHDLAFA TRPKLVAADI IHYDSTDIAF
121 SPYGEYWRQI RKICILELLS AKMVKFFSSI RQDELSKMLS SIRTTPNLTV NLTDKIFWFT
181 SSVTCRSALG KICGDQDKLI IFMREIISLA GGFSIADFFP TWKMIHDIDG SKSKLVKAHR
241 KIDEILGNVV DEHKKNRADG KKGNGEFGGE DLIDVLLRVR ESGEVQIPIT NDNIKSILID
301 MFSAGSETSS TTIIWALAEM MKKPSVLAKA QAEVRQALKE KKGFQQIDLD ELKYLKLVIK
361 ETLRMHPPIP LLVPRECMED TKIDGYNIPF KTRVIVNAWA IGRDPESWDD PESFMPERFE
421 NSSIDFLGNH HQFIPFGAGR RICPGMLFGL ANVGQPLAQL LYHFDWKLPN GQSHENFDMT
481 ESPGISATRK DDLVLIATPY DSY
```

FIG. 76

NAME D89-AD2
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 151

```
   1 TCCTTCTTCC TTCCTAAGTC CTAACTAAAA ATGGAGATTC AGTTTTCTAA CTTAGTTGCA
  61 TTCTTGCTCT TTCTCTCCAG CATCTTTCTT CTATTCAAAA AATGGAAAAC CAGAAAACTA
 121 AATTTGCCTC CTGGTCCATG GAAATTACCT TTTATTGGAA GTTTACACCA TTTGGCTGTG
 181 GCAGGTCCAC TTCCTCACCA TGGCCTAAAA AATTTAGCCA AACGCTATGG TCCTCTTATG
 241 CATTTACAAC TTGGACAAAT TCCTACACTC ATCATATCAT CACCTCAAAT GGCAAAAGAA
 301 GTACTAAAAA CTCACGACCT CGCTTTTGCC ACTAGACCAA AGCTTGTCGT GGCCGACATC
 361 ATTCACTACG ACAGCACGGA CATAGCATTT TCTCCGTACG GTGAATACTG GAGACAAATT
 421 CGTAAAATTT GCATATTGGA ACTCTTGAGT GCCAAGATGG TCAAATTTTT TAGCTCGATT
 481 CGCCAAGATG AGCTCTCGAA GATGCTCTCA TCTATACGAA CGACACCCAA TCTTACAGTC
 541 AATCTTACTG ACAAAATTTT TTGGTTTACG AGTTCGGTAA CTTGTAGATC AGCTTTAGGG
 601 AAGATATGTG GTGACCAAGA CAAATTGATC ATTTTTATGA GGGAAATAAT ATCATTGGCA
 661 GGTGGATTTA GTATTGCTGA TTTTTTCCCT ACATGGAAAA TGATTCATGA TATTGATGGT
 721 TCGAAATCTA AACTGGTGAA AGCACATCGT AAGATTGATG AAATTTTGGG AAATGTTGTT
 781 GATGAGCACA AAAAGAACAG AGCAGATGGC AAGAAGGGTA ATGGTGAATT TGGTGGTGAA
 841 GATTTGATTG ATGTATTGTT AAGAGTTAGA GAAAGTGGAG AAGTTCAAAT TCCTATCACA
 901 AATGACAATA TCAAATCAAT ATTAATCGAC ATGTTCTCTG CGGGATCTGA AACATCATCG
 961 ACGACTATAA TTTGGGCATT AGCTGAAATG ATGAAGAAAC CAAGTGTTTT AGCAAAGGCA
1021 CAAGCTGAAG TAAGGCAAGC TTTGAAGGAG AAAAAAGGTT TTCAACAGAT TGATCTTGAT
1081 GAGCTAAAAT ATCTCAAGTT AGTAATCAAA GAAACCTTAA GAATGCACCC TCCAATTCCT
1141 CTATTAGTTC CTAGAGAATG TATGGAGGAT ACAAAGATTG ATGGTTACAA TATACCTTTC
1201 AAAACAAGAG TCATAGTTAA TGCATGGGCA ATCGGACGAG ATCCAGAAAG TTGGGATGAC
1261 CCCGAAAGCT TTATGCCAGA GAGATTTGAG AATAGTTCTA TTGACTTTCT TGGAAATCAT
1321 CATCAGTTTA TACCATTTGG TGCAGGAAGA AGGATTTGTC CGGGAATGCT ATTTGGTTTA
1381 GCTAATGTTG GACAACCTTT AGCTCAGTTA CTTTATCACT TCGATTGGAA ACTCCCTAAT
1441 GGACAAAGTC ATGAGAATTT CGACATGACT GAGTCACCTG GAATTTCTGC TACAAGAAAG
1501 GATGATCTTG TTTTGATTGC CACTCCTTAT GATTCTTATT AAGCAGTAGC AGAAATAAAA
1561 AGCCGGGGCA AACAGAAAAA A
```

SEQ. ID. NO. 152

```
   1 MEIQFSNLVA FLLFLSSIFL LFKKWKTRKL NLPPGPWKLP FIGSLHHLAV AGPLPHHGLK
  61 NLAKRYGPLM HLQLGQIPTL IISSPQMAKE VLKTHDLAFA TRPKLVVADI IHYDSTDIAF
 121 SPYGEYWRQI RKICILELLS AKMVKFFSSI RQDELSKMLS SIRTTPNLTV NLTDKIFWFT
 181 SSVTCRSALG KICGDQDKLI IFMREIISLA GGFSIADFFP TWKMIHDIDG SKSKLVKAHR
 241 KIDEILGNVV DEHKKNRADG KKGNGEFGGE DLIDVLLRVR ESGEVQIPIT NDNIKSILID
 301 MFSAGSETSS TTIIWALAEM MKKPSVLAKA QAEVRQALKE KKGFQQIDLD ELKYLKLVIK
 361 ETLRMHPPIP LLVPRECMED TKIDGYNIPF KTRVIVNAWA IGRDPESWDD PESFMPERFE
 421 NSSIDFLGNH HQFIPFGAGR RICPGMLFGL ANVGQPLAQL LYHFDWKLPN GQSHENFDMT
 481 ESPGISATRK DDLVLIATPY DSY
```

FIG. 77

NAME D90A-BB3
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 153

```
   1 CAACTGCAGT TTGAAGATAC CAACTAACCA AAATGCAGTT CTTCAGCTTG GTTTCCATTT
  61 TCCTATTTCT ATCTTTTCTC TTTTTGTTAA GGAAATGGAA GAACTCGAAT AGCCAAAGGA
 121 AAAAATTGCC ACCAGGTCCA TGGAAACTAC CAATACTAGG AAGTATGCTT CATATGGTTG
 181 GTGGACTACC ACACCATGTC CTTAGAGATT TAGCCAAAAA ATATGGACCG CTTATGCACC
 241 TTCAATTAGG TGAAGTTTCT GCAGTTGTGG TTACTTCTCC TGATATGGCA AAAGAAGTAC
 301 TAAAAACTCA TGACATCGCT TTCGCGTCTA GGCCTAGCCT TTTGGCCCCG GAGATTGTCT
 361 GTTACAATAG GTCTGATCTT GCGTTTTGCC CCTATGGCGA TTATTGGAGA CAAATGCGTA
 421 AAATATGTGT CTTGGAAGTG CTCAGTGCCA AGAATGTTCG GACATATAGC TCTATTAGGC
 481 GCGATGAAGT TCTTCGTCTC CTTAATTTTA TCCGGTCATC TTCTGGTGAG CCTGTTAATA
 541 TTACGGAAAG GATCTTTTTG TTCACAAGCT CCATGACATG TAGATCAGCG TTTGGGCAAG
 601 TATTCAAGGA GCAAGACAAA TTTATACAAC TAATTAAAGA AGTTATACTC TTAGCAGGAG
 661 GGTTTGATGT GGCTGACATA TTCCCTTCAT ACAAGTCTCT TCATGTGCTC AGTGGAATGA
 721 AGGGTAAGAT TATGAATGCA CACCATAAGG TAGATGCTAT TGTTGAGAAT GTCATCAACG
 781 AGCACAAGAA AAATCTTGCA ATTGGGAAAA CTAATGGAGC GTTAGGAGGT GAAGATTTAA
 841 TTGATGTTCT TCTAAAACTT ATGAATGATG GAGGCCTTCA ATTTCCTATC ACCAACGACA
 901 ACATCAAAGC TATAATCTTT GACATGTTTG CTGCTGGAAC AGAGACTTCA TCGTCAACAA
 961 TTGTGTGGGC TATGGTGGAA ATGGTGAAAA ATCCAACTGT ATTTGCGAAA GCTCAAGCAG
1021 AAGTAAGAGA TGCATTTAGA GAAAAAGAAA CTTTTGATGA AAATGATGTG GAGGAGCTAA
1081 ACTATCTAAA GTTAGTCATT AAAGAAACTC TAAGACTTCA TCCACCGGTT CCACTTTTGC
1141 TCCCAAGAGA ATGTAGGGAA GAGACAAATA TAAACGGCTA CACTATTCCT GTAAAGACCA
1201 AAGTCATGGT TAATGTTTGG GCATTGGGAA GAGATCCAAA ATATTGGGAT GATGCAGAAA
1261 CTTTTAAGCC AGAGAGATTT GAGCAGTGCT CTAAGGATTT TGTTGGTAAT AATTTTGAAT
1321 ATCTTCCATT TGGTGGTGGA AGGAGGATTT GTCCAGGGAT TTCGTTTGGT TTAGCTAATG
1381 CTTATTTGCC ATTGGCTCAA TTACTTTATC ACTTTGATTG GGAACTCCCC ACTGGAATCA
1441 AACCAAGCGA CTTGGACTTG ACTGAGTTGG TTGGAGTAAC TGCCGCTAGA AAAAGTGACC
1501 TTTACTTGGT TGCGACTCCT TATCAACCTC CTCAAAAC
```

SEQ. ID. NO. 154

```
   1 MQFFSLVSIF LFLSFLFLLR KWKNSNSQRK KLPPGPWKLP ILGSMLHMVG GLPHHVLRDL
  61 AKKYGPLMHL QLGEVSAVVV TSPDMAKEVL KTHDIAFASR PSLLAPEIVC YNRSDLAFCP
 121 YGDYWRQMRK ICVLEVLSAK NVRTYSSIRR DEVLRLLNFI RSSSGEPVNI TERIFLFTSS
 181 MTCRSAFGQV FKEQDKFIQL IKEVILLAGG FDVADIFPSY KSLHVLSGMK GKIMNAHHKV
 241 DAIVENVINE HKKNLAIGKT NGALGGEDLI DVLLKLMNDG GLQFPITNDN IKAIIFDMFA
 301 AGTETSSSTI VWAMVEMVKN PTVFAKAQAE VRDAFREKET FDENDVEELN YLKLVIKETL
 361 RLHPPVPLLL PRECREETNI NGYTIPVKTK VMVNVWALGR DPKYWDDAET FKPERFEQCS
 421 KDFVGNNFEY LPFGGGRRIC PGISFGLANA YLPLAQLLYH FDWELPTGIK PSDLDLTELV
 481 GVTAARKSDL YLVATPYQPP QN
```

FIG. 78

```
NAME          D95-AG1
ORGANISM      NICOTIANA TABACUM
SEQ. ID. NO. 155
   1 AAAAGATGTC TTCATTTTCC ACATCTTCTG CCACTTCTAA TTCCAAACTT CCAGTTCGAG
  61 AAATCCCAGG AGACTATGGT TTCCCCTTTT TTGGAGCCAT AAAAGATAGA TATGACTACT
 121 TCTACAACCT CGGCACAGAC GAATTCTTTC TTACCAAAAT GCAAAAATAC AACTCTACTG
 181 TCTTTAGAAC CAACATGCCA CCAGGTCCAT TCATTGCTAA AAATCCCAAA GTAATTGTTC
 241 TCCTCGATGC CAAAACATTT CCCGTTCTTT TCGACAACTC TAAAGTCGAA AAAATGAACG
 301 TTCTTGATGG CACGTACGTG CCATCTACTG ATTTCTATGG CGGATATCGC CCGTGTGCTT
 361 ATCTTGATCC TTCTGAGTCA ACTCATGCCA CACTTAAAGG GTTCTTTTTA TCTTTAATCT
 421 CCCAGCTTCA TAATCAATTT ATTCCTTTAT TTAGAACCTC AATTTCTGGT CTTTTCGCAA
 481 ATCTTGAGAA TGAGATTTCC CAAAATGGCA AAGCGAACTT CAACAATATC AGCGACATTA
 541 TGTCATTCGA TTTTGTTTTT CGTTTGTTAT GTGACAAGAC CAGTCCCCAT GACACAAATC
 601 TTGGCTCTAA TGGACCAAAA CTCTTTGATA TATGGCTGTT GCCTCAACTT GCTCCATTGT
 661 TTAGTCTAGG TCTAAAATTT GTGCCGAACT TTCTGGAAGA TTTAATGTTG CATACTTTTC
 721 CCTTGCCATT TTTTCTAGTG AGATCGAATT ACCAGAAGCT TTATGATGCT TTTAGCAAGC
 781 ATGCCGAAAG TACACTGAAT GAAGCAGAGA AGAATGGGAT CAAAAGAGAC GAAGCATGCC
 841 ACAACTTAGT TTTTCTTGCA GGTTTCAATG CTTATGGTGG GATGAAAGTT TTATTCCCTG
 901 CACTGATAAA GTGGGTCGCC AATGGAGGAA AGAGTTTACA CACTCGGCTG GCAAATGAAA
 961 TCAGGACAAT TATCAAAGAA GAATGTGGGA CCATAACTCT ATCAGCAATC AACAAGATGA
1021 GTTTAGTAAA ATCAGTAGTG TATGAAGTAT TAAGAATTGA ACCTCCAGTT CCATTCCAAT
1081 ATGGTAAAGC CAAAGAAGAT ATCATAATCC AAAGCCATGA TTCAACTTTC TTAGTCAAGA
1141 AAGGTGAAAT GATCTTTGGA TATCAGCCTT TTGCTACAAA AGATCCAAAG ATTTTTGACA
1201 AACCAGAGGA GTTTATTCCG GAGAGGTTCA TGGCCGAAGG GGAAAAATTA TTAAAGTATG
1261 TGTATTGGTC AAATGCAAGA GAGACAGATG ATCCAACGGT GGACAACAAA CAATGCCCAG
1321 CGAAAAATCT TGTCGTGCTT TTGTGCAGGT TGATGTTGGT GGAGGTTTTC ATGCGTTACG
1381 ACACATTCAC AGTGGAGTCA ACAAAGCTCT TTCTTGGGTC ATCAGTAACG TTCACGACTC
1441 TGGAAAAAGC GACATGAGTT TCAGATATCT TAATTGTAGG CTGCAAATAA TAATGTGGTC
1501 ATTCTGCAAA TTATTGTACT TGTGCTGATG

SEQ. ID. NO. 156
   1 MSSFSTSSAT SNSKLPVREI PGDYGFPFFG AIKDRYDYFY NLGTDEFFLT KMQKYNSTVF
  61 RTNMPPGPFI AKNPKVIVLL DAKTFPVLFD NSKVEKMNVL DGTYVPSTDF YGGYRPCAYL
 121 DPSESTHATL KGFFLSLISQ LHNQFIPLFR TSISGLFANL ENEISQNGKA NFNNISDIMS
 181 FDFVFRLLCD KTSPHDTNLG SNGPKLFDIW LLPQLAPLFS LGLKFVPNFL EDLMLHTFPL
 241 PFFLVRSNYQ KLYDAFSKHA ESTLNEAEKN GIKRDEACHN LVFLAGFNAY GGMKVLFPAL
 301 IKWVANGGKS LHTRLANEIR TIIKEECGTI TLSAINKMSL VKSVVYEVLR IEPPVPFQYG
 361 KAKEDIIIQS HDSTFLVKKG EMIFGYQPFA TKDPKIFDKP EEFIPERFMA EGEKLLKYVY
 421 WSNARETDDP TVDNKQCPAK NLVVLLCRLM LVEVFMRYDT FTVESTKLFL GSSVTFTTLE
 481 KAT
```

FIG. 79

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NAME          D96-AB6
ORGANISM      NICOTIANA TABACUM
SEQ. ID. NO. 157
   1 CCAAAAATGG AGCTTCAATC TTCTCCTTTC AATTTAATTT CTTTGTTCCT CTTCTTTTCT
  61 TTTCATTTTA TTCTAGTGAA GAAATGGAAT GCCAAAATCC CAAAGTTACC TCCAGGTCCG
 121 TGGAGGCTTC CCTTTATTGG AAGCCTCCAT CACTTGAAGG GAAAACTTCC ACACCATAAT
 181 CTTAGAGATC TAGCGCGAAA ATATGGGCCT CTCATGTACT TACAACTCGG AGAAATTCCT
 241 GTAGTTGTAA TATCTTCGCC ACGTGTAGCA AAAGCTGTAC TAAAAACTCA TGATCTCGCT
 301 TTTGCAACTA GACCACGATT CATGTCCTCA GACATTGTGT TTTACAAAAG CAGGGACATC
 361 TCTTTTGCCC CATTTGGTGA TTACTGGAGA CAGATGCGTA AAATATTGAC TCAGGAACTC
 421 CTGAGTAACA AGATGCTCAA GTCATATAGC TTAATCCGAA AGGATGAGCT CTCGAAGCTC
 481 CTCTCATCGA TTCGTTTGGA AACAGGTTCT GCAGTGAACA TAAATGAAAA GCTTCTCTGG
 541 TTTACGAGCT GCATGACCTG TAGATTAGCC TTTGGAAAAA TATGCAATGA TCGGGATGAG
 601 TTGATCATGC TAATTAGGGA GATATTAACA TTATCAGGAG GATTTGATGT GGGTGATTTG
 661 TTCCCTTCCT GGAAATTACT TCATAATATG AGCAACATGA AAGCTAGGTT GACGAATGTA
 721 CACCACAAGT ATGATTTAGT TATGGAGAAC ATCATCAATG AGCACCAAGA GAATCATGCA
 781 GCAGGGATAA AGGGTAACAA CGAGTTTGGT GGCGAAGATA TGATCGATGC TCTACTGAGG
 841 GCTAAGGAGA ATAATGAGCT TCAATTTCCT ATCGAAAATG ACAACATGAA AGCAGTAATT
 901 CTGGACTTGT TTATTGCTGG AACTGAAACT TCATATACTG CAATTATATG GGCACTATCA
 961 GAATTGATGA AGCACCCAAG TGTGATGGCC AAGGCACAAG CTGAAGTGAG AAAAGTCTTC
1021 AAAGAAAATG AAAATTTCGA CGAAAATGAT CTTGACAAGT TGCCATACTT AAAATCAGTG
1081 ATTAAAGAAA CACTAAGGAT GCACCCTCCA GTTCCTTTGT TAGGGCCTAG AGAATGCAGG
1141 GACCAAACAG AGATCGATGG CTACACTGTA CCTATTAAAG CTAGAGTTAT GGTTAATGCT
1201 TGGGCGATAG GAAGAGATCC TGAAAGTTGG GAAGATCCTG AAAGTTTCAA ACCGGAGCGA
1261 TTTGAAAATA CTTCTGTTGA TCTTACAGGA AATCACTATC AGTTCATTCC TTTCGGTTCA
1321 GGAAGAAGAA TGTGTCCAGG AATGTCGTTT GGTTTAGTTA ACACAGGGCA TCCTTTAGCC
1381 CAGTTGCTCT ATTGCTTTGA CTGGAAACTC CCTGACAAGG TTAATGCAAA TGATTTTCGC
1441 ACTACTGAAA CAAGTAGAGT TTTTGCAGCA AGCAAAGATG ACCTCTACTT GATTCCCACA
1501 AATCACAGGG AGCAAGAATA GCTTAATTTA ATGGAGTTCT TGGAAGAATT AAAGAAGAAG
1561 GGCTATATAG GTGAGATTTT TTGTATGGTT GCA

SEQ. ID. NO. 158
   1 MELQSSPFNL ISLFLFFSFH FILVKKWNAK IPKLPPGPWR LPFIGSLHHL KGKLPHHNLR
  61 DLARKYGPLM YLQLGEIPVV VISSPRVAKA VLKTHDLAFA TRPRFMSSDI VFYKSRDISF
 121 APFGDYWRQM RKILTQELLS NKMLKSYSLI RKDELSKLLS SIRLETGSAV NINEKLLWFT
 181 SCMTCRLAFG KICNDRDELI MLIREILTLS GGFDVGDLFP SWKLLHNMSN MKARLTNVHH
 241 KYDLVMENII NEHQENHAAG IKGNNEFGGE DMIDALLRAK ENNELQFPIE NDNMKAVILD
 301 LFIAGTETSY TAIIWALSEL MKHPSVMAKA QAEVRKVFKE NENFDENDLD KLPYLKSVIK
 361 ETLRMHPPVP LLGPRECRDQ TEIDGYTVPI KARVMVNAWA IGRDPESWED PESFKPERFE
 421 NTSVDLTGNH YQFIPFGSGR RMCPGMSFGL VNTGHPLAQL LYCFDWKLPD KVNANDFRTT
 481 ETSRVFAASK DDLYLIPTNH REQE
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FIG. 80

NAME D96-AC2
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 159

```
   1 CTTCTTCCAA AAATGGAGCT TCAATCTTCT CCTTTCAATT TAATTTCTTT GTTCCTCTTC
  61 TTTTCTTTTC TTTTTATTCT AGTGAAGAAA TGGAATGCCA AAATCCCAAA GTTACCTCCA
 121 GGTCCGTGGA GGCTTCCCTT TATTGGAAGC CTCCATCACT TGAAGGGAAA ACTTCCACAC
 181 CATAATCTTA GAGATCTAGC GCGAAAATAT GGACCTCTCA TGTACTTACA ACTCGGAGAA
 241 ATTCCTGTAG TTGTAATATC TTCGCCACGT GTAGCAAAAG CTGTACTAAA AACTCATGAT
 301 CTCGCTTTTG CAACTAGACC ACGATTCATG TCCTCAGACA TTGTGTTTTA CAAAAGCAGG
 361 GACATCTCTT TTGCCCCATT TGGTGATTAC TGGAGACAGA TGCGTAAAAT ATTGACTCAG
 421 GAACTCCTGA GTAACAAGAT GCTCAAGTCA TATAGCTTAA TCCGAAAGGA TGAGCTCTCG
 481 AAGCTCCTCT CATCGATTCG TTTGGAAACA GGTTCTGCAG TGAACATAAA TGAAAAGCTT
 541 CTCTGGTTTA CGAGCTGCAT GACCTGTAGA TTAGCCTTTG GAAAAATATG CAATGATCGG
 601 GATGAGTTGA TCATGCTAAT TAGGGAGATA TTAACATTAT CAGGAGGATT TGATGTGGGT
 661 GATTTGTTCC CTTCCTGGAA ATTACTTCAT AATATGAGCA ACATGAAAGC TAGGTTGACG
 721 AATGTACACC ACAAGTATGA TTTAGTTATG GAGAACATCA TCAATGAGCA CCAAGAGAAT
 781 CATGCAGCAG GGATAAAGGG TAACAACGAG TTTGGTGGCG AAGATATGAT CGATGCTCTA
 841 CTGAGGGCTA AGGAGAATAA TGAGCTTCAA TTTCCTATCG AAAATGACAA CATGAAAGCA
 901 GTAATTCTGG ACTTGTTTAT TGCTGGAACT GAAACTTCAT ATACTGCAAT TATATGGGCA
 961 CTATCAGAAT TGATGAAGCA CCCAAGTGTG ATGGCCAAGG CACAAGCTGA AGTGAGAAAA
1021 GTCTTCAAAG AAAATGAAAA TTTCGACGAA AATGATCTTG ACAAGTTGCC ATACTTAAAA
1081 TCAGTGATTA AAGAAACACT AAGGATGCAC CCTCCAGTTC CTTTGTTAGG GCCTAGAGAA
1141 TGCAGGGACC AAACAGAGAT CGATGGCTAC ACTGTACCTA TTAAAGCTAG AGTTATGGTT
1201 AATGCTTGGG CGATAGGAAG AGATCCTGAA AGTTGGGAAG ATCCTGAAAG TTTCAAACCG
1261 GAGCGATTTG AAAATACTTC TGTTGATCTT ACAGGAAATC ACTATCAGTT CATTCCTTTC
1321 GGTTCAGGAA GAAGAATGTG TCCAGGAATG TCGTTTGGTT TAGTTAACAC AGGGCATCCT
1381 TTAGCCCAGT TGCTCTATTG CTTTGACTGG AAACTCCCTG ACAAGGTTAA TGCAAATGAT
1441 TTTCGCACTA CTGAAACAAG TAGAGTTTTT GCAGCAAGCA AAGATGACCT CTACTTGATT
1501 CCCACAAATC ACAGGGAGCA AGAATAGCTT AATTTAATGG AGTTCTTGGA AGAATTAAAG
1561 AAGAAGGGCT ATATAGGTGA GATTTTTTGT ATGGTTGCA
```

SEQ. ID. NO. 160

```
   1 MELQSSPFNL ISLFLFFSFL FILVKKWNAK IPKLPPGPWR LPFIGSLHHL KGKLPHHNLR
  61 DLARKYGPLM YLQLGEIPVV VISSPRVAKA VLKTHDLAFA TRPRFMSSDI VFYKSRDISF
 121 APFGDYWRQM RKILTQELLS NKMLKSYSLI RKDELSKLLS SIRLETGSAV NINEKLLWFT
 181 SCMTCRLAFG KICNDRDELI MLIREILTLS GGFDVGDLFP SWKLLHNMSN MKARLTNVHH
 241 KYDLVMENII NEHQENHAAG IKGNNEFGGE DMIDALLRAK ENNELQFPIE NDNMKAVILD
 301 LFIAGTETSY TAIIWALSEL MKHPSVMAKA QAEVRKVFKE NENFDENDLD KLPYLKSVIK
 361 ETLRMHPPVP LLGPRECRDQ TEIDGYTVPI KARVMVNAWA IGRDPESWED PESFKPERFE
 421 NTSVDLTGNH YQFIPFGSGR RMCPGMSFGL VNTGHPLAQL LYCFDWKLPD KVNANDFRTT
 481 ETSRVFAASK DDLYLIPTNH REQE
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FIG. 81

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NAME          D98-AA1
ORGANISM      NICOTIANA TABACUM
SEQ. ID. NO. 161
         1 CTTTCTTTCT TGTACCGAGA TGGAGTTTCA ACACTTGGTT TCGTTCTTGC TATTCATCTC
        61 CTTCATCTTT CTTCTAATTC AAAAATGGAG GAAATCGAAA AAGCTGCCAC CTGGTCCGTG
       121 GAGGCTACCT ATTATTGGAA GTGTGCATCA CTTGACAAGT GGAGTACCAC ATCGAGTTCT
       181 CAGAAATTTA TCACAAAAAT TTGGCCCGAT CATGTACTTG CAGCTCGGGG AAGTTCCCAC
       241 AGTAGTTGTA TCCTCCCCAC ACATGGCCAA ACAAATTTTA AAAACTCATG ACCTCGCTTT
       301 TGCATCTAGG CCAGAAATCA TGATGGGAAA AATTATTTGC TACGATTGTA AGGACATTGC
       361 CTTTTCCCCG TATGGTGATT ATTGGAGACA TATGCGTAAA TTGAGCACCT TGGAACTACT
       421 TAGTGCCAAG ATGGTCAAGT CCTTCAGTCC AATTCGTCAA GATGAGCTCT CAAGTCTCCT
       481 ATCATCCATT GAATCAATGG GAAATTTGCC AATCAACTTA GTAGAAAAAC TTTTATGGTT
       541 TATGAATGCC GCGACATGTA GGTCAGCATT TGGGAAAGTG TGTAAAGATC AAAAAGAGTT
       601 GATAACATTG ATTCAACGAG CAGAATCATT ATCTGGTGGA TTCGAGCTGG CTGATTTGTT
       661 CCCTTCGAAG AAGTTTCTAC ATGGTATTAG TGGGATGCGA TCTAAACTAA TGGAAGCTCG
       721 TAACAAGATA GACGCAGTCT TGGACAACAT TATCAATGTG CACAGAGAGA ATCGGGCAAA
       781 TGGAAATAGT TGTAATGGTG AGTCTGGAAC TGTAGATTTC ATCGATGTTT TTCTAAGGGT
       841 CATGGAGAGT GGCGAATTAC CATTTCCGAT AGAAAATGAC AACATCAAAG CAGTTATTCT
       901 TGACATGTTC GTAGCAGGAT CTGACACATC ATCTTCAACC GTTATTTGGG CATTAACAGA
       961 AATGATGAAG AATCCAAAAG TCATGGCTAA AGCACAAGCT GAAGTGAGAG AAGCTTTTAA
      1021 AGGAAAGAAA GCATGTGATG AGGATACTGA TCTTGAAAAG CTTCATTACC TAAATTTAGT
      1081 GATCAAAGAG ACACTCCGAT TACACCCTCC AACTCCTCTA CTTGTCCCGC GAGAATGCAG
      1141 GGAGGAAACA GAGATAGAAG GATTCACTAT ACCATTGAAA AGCAAAGTCT TGGTTAACGT
      1201 ATGGGCAATT GGAAGAGATC CCGAGAATTG GAAAAATCCT GAATGTTTTA TACCAGAGAG
      1261 ATTCGAAAAT AGTTCTATTG AGTTTACTGG AAATCATTTT CAACTTCTTC CGTTTGGCGC
      1321 TGGAAGACGA ATTTGTCCAG GAATGCAATT TGGTTTGGCT CTTGTTACTC TGCCATTGGC
      1381 TCATTTGCTT CACAATTTTG ATTGGAAACT TCCCGAAGGA ATTAATGCAA GGGATTTGGA
      1441 CATGACAGAG GCAAATGGGA TATCTGCTAG AAGAGAAAAA GATCTTTACT TGATTGCTAC
      1501 TCCTTATGTA TCACCTCTTG ATTAACTCTG AAATTTGCTT TTAATGCTGC TTGCTTGCTT
      1561 CACT

SEQ. ID. NO. 162
         1 MEFQHLVSFL LFISFIFLLI QKWRKSKKLP PGPWRLPIIG SVHHLTSGVP HRVLRNLSQK
        61 FGPIMYLQLG EVPTVVVSSP HMAKQILKTH DLAFASRPEI MMGKIICYDC KDIAFSPYGD
       121 YWRHMRKLST LELLSAKMVK SFSPIRQDEL SSLLSSIESM GNLPINLVEK LLWFMNAATC
       181 RSAFGKVCKD QKELITLIQR AESLSGGFEL ADLFPSKKFL HGISGMRSKL MEARNKIDAV
       241 LDNIINVHRE NRANGNSCNG ESGTVDFIDV FLRVMESGEL PFPIENDNIK AVILDMFVAG
       301 SDTSSSTVIW ALTEMMKNPK VMAKAQAEVR EAFKGKKACD EDTDLEKLHY LNLVIKETLR
       361 LHPPTPLLVP RECREETEIE GFTIPLKSKV LVNVWAIGRD PENWKNPECF IPERFENSSI
       421 EFTGNHFQLL PFGAGRRICP GMQFGLALVT LPLAHLLHNF DWKLPEGINA RDLDMTEANG
       481 ISARREKDLY LIATPYVSPL D
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FIG. 82

NAME D98-AG1
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 163

```
   1 CTTTCTTGTA CCGAGATGGA GTTTCAACAC TTGGTTTCGT TCTTGCTATT CATCTCCTTC
  61 ATCTTTCTTC TAATTCAAAA ATGGAGGAAA TCGAAAAAGC TGCCACCTGG TCCGTGGAGG
 121 CTACCTATTA TTGGAAGTGT GCATCACTTG ACAAGTGGAG TACCACATCG AGTTCTCAGA
 181 AATTTATCAC AAAAATTTGG CCCGATCATG TACTTGCAGC TCGGGGAAGT TCCCACAGTA
 241 GTTGTATCCT CCCCACACAT GGCCAAACAA ATTTTAAAAA CTCATGACCT CGCTTTTGCA
 301 TCTAGGCCAG AAATCATGAT GGGAAAAATT ATTTGCTACG ATTGTAAGGA CATTGCCTTT
 361 TCCCCGTATG GTGATTATTG GAGACATATG CGTAAATTGA GCACCTTGGA ACTACTTAGT
 421 GCCAAGATGG TCAAGTCCTT CAGTCCAATT CGTCAAGATG AGCTCTCAAG TCTCCTATCA
 481 TCCATTGAAT CAATGGGAAA TTTGCCAATC AACTTAGTAG AAAAACTTTT ATGGTTTATG
 541 AATGCCGCGA CATGTAGGTC AGCATTTGGG AAAGTGTGTA AAGATCAAAA AGAGTTGATA
 601 ACATTGATTC AACGAGCAGA ATCATTATCT GGTGGATTCG AGCTGGCTGA TTTGTTCCCT
 661 TCGAAGAAGT TTCTACATGG TATTAGTGGG ATGCGATCTA AACTAATGGA AGCTCGTAAC
 721 AAGATAGACG CAGTCTTGGA CAACATTATC AATGTGCACA GAGAGAATCG GGCAAATGGA
 781 AATAGTTGTA ATGGTGAGTC TGGAACTGTA GATTTCATCG ATGTTTTTCT AAGGGTCATG
 841 GAGAGTGGCG AATTACCATT TCCGATAGAA AATGACAACA TCAAAGCAGT TATTCTTGAC
 901 ATGTTCGTAG CAGGATCTGA CACATCATCT TCAACCGTTA TTTGGGCATT AACAGAAACG
 961 ATGAAGAATC CAAAAGTCAT GGCTAAAGCA CAAGCTGAAG TGAGAGAAGC TTTTAAAGGA
1021 AAGAAAGCAT GTGATGAGGA TACTGATCTT GAAAAGCATC ATTACCTAAA TTTAGTGATC
1081 AAAGAGACAC TCCGATTACA CCCTCCAACT CCTCTACTTG TCCCGCGAGA ATGCAGGGAG
1141 GAAACAGAGA TAGAAGGATT CACTATACCA TTGAAAAGCA AAGTCTTGGT TAACGTATGG
1201 GCAATTGGAA GAGATCCCGA GAATTGGAAA AATCCTGAAT GTTTTATACC AGAGAGATTC
1261 GAAAATAGTT CTATTGAGTT TACTGGAAAT CATTTTCAAC TTCTTCCGTT TGGCGCTGGA
1321 AGACGAATTT GTCCAGGAAT GCAATTTGGT TTGGCTCTTG TTACTCTGCC ATTGGCTCAT
1381 TTGCTTCACA ATTTTGATTG GAAACTTCCC GAAGGAATTA ATGCAAGGGA TTTGGACATG
1441 ACAGAGGCAA ATGGGATATC TGCTAGAAGA GAAAAAGATC TTTACTTGAT TGCTACTCCT
1501 TATGTATCAC CTCTTGATTA ACTCTGAAAT TTTGCTTTAA TGCTGCTTGC TTGCTTCACT
```

SEQ. ID. NO. 164

```
   1 MEFQHLVSFL LFISFIFLLI QKWRKSKKLP PGPWRLPIIG SVHHLTSGVP HRVLRNLSQK
  61 FGPIMYLQLG EVPTVVVSSP HMAKQILKTH DLAFASRPEI MMGKIICYDC KDIAFSPYGD
 121 YWRHMRKLST LELLSAKMVK SFSPIRQDEL SSLLSSIESM GNLPINLVEK LLWFMNAATC
 181 RSAFGKVCKD QKELITLIQR AESLSGGFEL ADLFPSKKFL HGISGMRSKL MEARNKIDAV
 241 LDNIINVHRE NRANGNSCNG ESGTVDFIDV FLRVMESGEL PFPIENDNIK AVILDMFVAG
 301 SDTSSSTVIW ALTETMKNPK VMAKAQAEVR EAFKGKKACD EDTDLEKHHY LNLVIKETLR
 361 LHPPTPLLVP RECREETEIE GFTIPLKSKV LVNVWAIGRD PENWKNPECF IPERFENSSI
 421 EFTGNHFQLL PFGAGRRICP GMQFGLALVT LPLAHLLHNF DWKLPEGINA RDLDMTEANG
 481 ISARREKDLY LIATPYVSPL D
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FIG. 83

NAME D100-BE2
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 165

```
   1 CAAAAACAAA ATTCCAATGG TTAACATGTT CACTCCAATT ATATACGCTC CTCTCCTTTT
  61 AGCTTTTTAC ATTATCACAA AACATTTCTT ACGCAAACTC AGAAATAATC CACCAGCTCC
 121 ATTTCTTACT TTCCCCTTTA TTGGCCATCT TTATCTCTTC AAAAAACCAC TTCAACGTAC
 181 CTTAGCCAAA ATCTCCGAAC GTTATGGCTC TGTTCTTCTA CTCGAATTCG GTTCACGAAA
 241 AGTACTTTTG GTTTCTTCAC CATCTGCAGC TGAAGAATGC TTAACAAAAA ACGATATTAT
 301 TTTCGCGAAT CGTCCTCTTT TGATGGCTGG AAAACATCTT GGATATAATT TTACATCTTT
 361 GGCTTGGAGT TCGTACGGAG ATCATTGGAG AAATCTGCGA AGGATTACTT CAGTTGAGAT
 421 GTTTTCGACT CATCGTCTTC AAATGCTACA TGGGATTCGT ATTGATGAAG TGAAATCTAT
 481 GGTTAAGAGG CTCAATTCCT CTGCCATAGC TGAAAAATCT GTGGATATGA AGTCTATGTT
 541 TTTTGAGCTG ATGCTCAATG TTATGATGAG GACAATTGCT GGAAAAAGAT ATTACGGTGA
 601 GAATGTGGAG GACATTGAGG AAGCTACGAG ATTCAAAGGT TTGGTGCAAG AGACTTTCAG
 661 GATTGGCGGG GCGACGAATA TTGGCGACTT TTTGCCGGCG TTGAAGTTAT TGGTGAGGAA
 721 ATTGGAGAAA AGTTTAATTG TGTTGCAAGA GAACAGAGAT GAGTTTATGC AGGAATTAAT
 781 TAAAGATTGC AGAAAAAGAA TGGAGAAAGA AGGTACTGTT ACTGATTCAG AAATTGAAGG
 841 GAACAAGAAA TGTTTAATTG AAGTTTTGTT AACACTACAA GAAAATGAAC CGGAATACTA
 901 CAAAGATGAA ATCATCAGAA GCCTTATGCT TGTTCTATTA TCAGCTGGTA CAGATACTTC
 961 AGTTGGGACA ATGGAATGGG CTTTATCATT AATGTTAAAC CACCCTGAAA CTCTGAAGAA
1021 AGCACAAGCT GAAATTGATG AACATATAGG ACATGAACGT TTAGTGGACG AGTCGGACAT
1081 CAACAACCTA CCTTACCTAC GTTGTATAAT CAACGAGACA TTCCGAATGT ACCCTGCAGG
1141 ACCACTACTA GTCCCACACG AGTCGTCAGA GGAAACCACC GTAGGAGGCT ACCGTGTACC
1201 CGGAGGAACC ATGTTACTTG TGAATTTGTG GGCAATTCAC AATGATCCAA AGCTATGGGA
1261 TGAACCAAGA AAGTTTAAAC CAGAAAGATT TCAAGGACTA GATGGTGTTA GAGATGGTTA
1321 CAAAATGATG CCTTTTGGTT CTGGACGAAG GAGTTGTCCT GGAGAAGGAT TGGCTGTTCG
1381 AATGGTTGCC TTGTCATTGG GATGTATTAT TCAATGTTTT GATTGGCAAC GAATCGGCGA
1441 AGAATTGGTT GATATGACTG AAGGAACTGG ACTTACTTTG CCTAAAGCTC AACCTTTGGT
1501 GGCCAAGTGT AGCCCACGAC CTAAAATGGC TAATCTTCTC TCTCAGATTT GA
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SEQ. ID. NO. 166

```
   1 MVNMFTPIIY APLLLAFYII TKHFLRKLRN NPPAPFLTFP FIGHLYLFKK PLQRTLAKIS
  61 ERYGSVLLLE FGSRKVLLVS SPSAAEECLT KNDIIFANRP LLMAGKHLGY NFTSLAWSSY
 121 GDHWRNLRRI TSVEMFSTHR LQMLHGIRID EVKSMVKRLN SSAIAEKSVD MKSMFFELML
 181 NVMMRTIAGK RYYGENVEDI EEATRFKGLV QETFRIGGAT NIGDFLPALK LLVRKLEKSL
 241 IVLQENRDEF MQELIKDCRK RMEKEGTVTD SEIEGNKKCL IEVLLTLQEN EPEYYKDEII
 301 RSLMLVLLSA GTDTSVGTME WALSLMLNHP ETLKKAQAEI DEHIGHERLV DESDINNLPY
 361 LRCIINETFR MYPAGPLLVP HESSEETTVG GYRVPGGTML LVNLWAIHND PKLWDEPRKF
 421 KPERFQGLDG VRDGYKMMPF GSGRRSCPGE GLAVRMVALS LGCIIQCFDW QRIGEELVDM
 481 TEGTGLTLPK AQPLVAKCSP RPKMANLLSQ I
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FIG. 84

NAME D100A-AC3
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 167

```
   1 CAAAAACAAA ATTCCAATGG TTAACATGTT CACTCCAATT ATATACGCTC CTCTCCTTTT
  61 AGCTTTTTAC ATTATCACAA AACATTTCTT ACGCAAACTC AGAAATAACC CACCAGCTCC
 121 ATTTCTTACT TTCCCCTTTA TTGGCCATCT TTATCTCTTC AAAAAACCAC TTCAACGTAC
 181 CTTAGCCAAA ATCTCCGAAC GTTATGGCTC TGTTCTTCTA CTCGAATTCG GTTCACGAAA
 241 AGTACTTTTG GTTTCTTCAC CATCTGCAGC TGAAGAATGC TTAACAAAAA ACGATATTAT
 301 TTTCGCGAAT CGTCCTCTTT TGATGGCTGG AAAACATCTT GGATATAATT TTACTTCTTT
 361 GGCTTGGAGT TCGTACGGAG ATCACTGGAG AAATCTTCGT AGGATTACTT CAGTTGAGAT
 421 GTTTTCGACT CATCGTCTTC AAATGCTACA TGGAATTCGT ATTGATGAAG TGAAATCTAT
 481 GGTTAAGAGG CTCAATTCCT CTGCCATAGC TGAAAAATCT GTGGATATGA AGTCTATGTT
 541 TTTTGAGCTG ATGCTCAATG TTATGATGAG GACAATTGCT GGAAAAAGAT ATTACGGTGA
 601 GAATGTGGAG GACATTGAGG AAGCTACGAG ATTCAAAGGT TTGGTGCAAG AGACTTTCAG
 661 GATTGGCGGG GCGACGAATA TTGGCGACTT TTTGCCGGCG TTGAAGTTAT TGGTGAGGAA
 721 ATTGGAGAAA AGTTTAATTG TGTTGCAAGA GAACAGAGAT GAGTTTATGC AGGAATTAAT
 781 TAAAGATTGC AGAAAAAGAA TGGAGAAAGA AGGTACTGTT ACTGATTCAG AAATTGAAGG
 841 GAACAAGAAA TGTTTAATTG AAGTTTTGTT AACACTACAA GAAAATGAAC CGGAATACTA
 901 CAAAGATGAA ATCATCAGAA GCCTTATGCT TGTTCTATTA TCAGCTGGTA CAGATACTTC
 961 AGTTGGGACA ATGGAATGGG CTTTATCATT AATGTTAAAC CACCCTGAAA CTCTGAAGAA
1021 AGCACAAGCT GAAATTGATG AACATATAGG ACATGAACGT TTAGTGGACG AGTCGGACAT
1081 CAACAACCTA CCTTACCTAC GTTGTATAAT CAACGAGACA TTCCGAATGT ACCCTGCAGG
1141 ACCACTACTA GTCCCACACG AGTCGTCAGA GGAAACCACC GTAGGAGGCT ACCGTGTACC
1201 CGGAGGAACC ATGTTACTTG TGAATTTGTG GGCTATTCAC AATGATCCAA AGCTATGGGA
1261 TGAACCAAGA AAGTTTAAGC CAGAAAGATT TGAAGGACTA GAAGGTGTTA GAGACGGTTA
1321 CAAAATGATG CCTTTTGGTT CTGGACGAAG GAGTTGTCCT GGAGAAGGAT TGGCTATTCG
1381 AATGGTTGCA TTGTCATTGG GATGTATTAT TCAATGCTTT GATTGGCAAC GACTTGGGGA
1441 AGGATTGGTT GATAAGACTG AAGGAACTGG ACTTACTTTG CCTAAAGCTC AACCTTTAGT
1501 GGCCAAGTGT AGCCCACGAC CTATAATGGC TAATCTTCTT TCTCAGATTT GAACATAATT
1561 GGTTTCTACC AAACATCCCC AAACTAGAAT ATTATTATTG GTTACATATA CAATGTAATC
1621 AATTTTGAAC CATATTATAT CTCAATGTAT TCCTTTTTAA AAAAAAAAAA AAAAA
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SEQ. ID. NO. 168

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   1 MVNMFTPIIY APLLLAFYII TKHFLRKLRN NPPAPFLTFP FIGHLYLFKK PLQRTLAKIS
  61 ERYGSVLLLE FGSRKVLLVS SPSAAEECLT KNDIIFANRP LLMAGKHLGY NFTSLAWSSY
 121 GDHWRNLRRI TSVEMFSTHR LQMLHGIRID EVKSMVKRLN SSAIAEKSVD MKSMFFELML
 181 NVMMRTIAGK RYYGENVEDI EEATRFKGLV QETFRIGGAT NIGDFLPALK LLVRKLEKSL
 241 IVLQENRDEF MQELIKDCRK RMEKEGTVTD SEIEGNKKCL IEVLLTLQEN EPEYYKDEII
 301 RSLMLVLLSA GTDTSVGTME WALSLMLNHP ETLKKAQAEI DEHIGHERLV DESDINNLPY
 361 LRCIINETFR MYPAGPLLVP HESSEETTVG GYRVPGGTML LVNLWAIHND PKLWDEPRKF
 421 KPERFEGLEG VRDGYKMMPF GSGRRSCPGE GLAIRMVALS LGCIIQCFDW QRLGEGLVDK
 481 TEGTGLTLPK AQPLVAKCSP RPIMANLLSQ I
```

FIG. 85

NAME D104A-AE8 (69,1755)
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 169

```
   1 CAACACGCTT ACTATCTCCT AAATCTCCAC TCAAAAACAA AGAAGAGAAA GATTTAAAAC
  61 TAATAATTAT GAAAGAGATG GTGCAAAACA ATATGAGCAC TTCTCTTCTT GAAACTTTAC
 121 AAGCTACGCC CATGATATTC TACTTCATCG TCCCTCTCTT CTGCTTATTC CTTCTCTCCA
 181 AATCTCGCCG TAAACGTTTG CCTCCAGGTC CAACTGGCTG GCCTCTCATT GGTAACATGA
 241 TGATGATGGA CCAGTTAACT CACCGTGGCC TTGCCAAACT AGCCCAAAAA TATGGTGGTG
 301 TTTTTCACCT TAAAATGGGT TATGTTCACA AAATTGTAGT CTCTGGTCCA GACGAAGCTC
 361 GCCAAGTATT ACAGGAACAC GACATCATAT TTTCGAACCG TCCAGCGACC GTAGCCATAA
 421 GTTACCTAAC ATATGACAGG GCAGACATGG CTTTTGCTGA CTATGGACTC TTCTGGCGGC
 481 AGATGAGAAA ACTATGTGTA ATGAAACTCT TCAGCCGCAA ACGAGCTGAG TCATGGGACT
 541 CAGTTCGAGA CGAAGCGGAT TCCATGGTTA GAATTGTAAC AACCAACACA GGCACAGCTG
 601 TTAACTTAGG TGAACTTGTT TTCAGTCTCA CTCGTAATAT TATCTACAGA GCTGCTTTTG
 661 GAACTTGTTC TGAAGATGGA CAAGGCGAGT TCATTAAAAT TATGCAAGAG TTTTCGAAGC
 721 TATTTGGTGC TTTCAATATA GCTGATTTTA TTCCATGGCT AGGGTGGGTT GGTAAGCAGA
 781 GTCTAAATAT TAGACTTGCT AAGGCTAGAG CGTCGCTTGA TGGGTTCATT GATTCGATTA
 841 TTGATGACCA TATTATTAGA AAGAAAGCTT ATGTTAATGG CAAAAATGAT GGAGGTGATC
 901 GAGAAACTGA TATGGTGGAT GAGCTTTTAG CTTTTTACAG TGAGGAAGCA AAAGTAACTG
 961 AGTCCGAAGA TTTGCAGAAT GCTATCAGAC TTACTAAGGA TAATATCAAA GCTATCATCA
1021 TGGATGTAAT GTTTGGAGGG ACAGAAACAG TGGCTTCTGC AATAGAATGG GCCATGGCAG
1081 AGCTTATGAG GAGTCCTGAA GATCTTAAAA AGGTACAACA AGAGCTGGCT AACGTTGTTG
1141 GACTCAACAG AAAAGTTGAA GAATCTGACT TTGAAAAATT AACATACTTA AGATGTTGTC
1201 TAAAAGAAAC TCTACGACTT CACCCTCCAA TCCCTCTCCT CCTCCATGAG ACCGCCGAGG
1261 AATCCACCGT CTCCGGCTAC CATATTCCGG CAAAGTCACA TGTTATTATA AATTCATTTG
1321 CCATTGGGCG TGACAAAAAT TCATGGGAAG ATCCTGAAAC TTATAAACCA TCTAGGTTTC
1381 TCAAAGAAGG TGTACCAGAT TTTAAAGGAG GTAATTTTGA GTTTATACCA TTTGGGTCGG
1441 GTCGGCGGTC TTGCCCCGGT ATGCAACTTG GGCTTTATGC ATTGGAAATG GCTGTGGCCC
1501 ATCTTCTTCA TTGTTTTACT TGGGAATTGC CAGATGGTAT GAAACCAAGT GAGCTTAAAA
1561 TGGATGATAT TTTTGGACTC ACTGCTCCAA GAGCTAATCG ACTCGTGGCT GTGCCTACTC
1621 CACGTTTGTT GTGTCCCCTT TATTAATTGA AGAAAAAAGG TGGGGCTTTT ACTTGCATCA
1681 AAGAGTGGTG CTTGTGATTT TTCCACCTTT TGGTTAAATA TACGAATTAT TATGATATAC
1741 GAATTCTTGG GCACA
```

SEQ. ID. NO. 170

```
   1 MKEMVQNNMS TSLLETLQAT PMIFYFIVPL FCLFLLSKSR RKRLPPGPTG WPLIGNMMMM
  61 DQLTHRGLAK LAQKYGGVFH LKMGYVHKIV VSGPDEARQV LQEHDIIFSN RPATVAISYL
 121 TYDRADMAFA DYGLFWRQMR KLCVMKLFSR KRAESWDSVR DEADSMVRIV TTNTGTAVNL
 181 GELVFSLTRN IIYRAAFGTC SEDGQGEFIK IMQEFSKLFG AFNIADFIPW LGWVGKQSLN
 241 IRLAKARASL DGFIDSIIDD HIIRKKAYVN GKNDGGDRET DMVDELLAFY SEEAKVTESE
 301 DLQNAIRLTK DNIKAIIMDV MFGGTETVAS AIEWAMAELM RSPEDLKKVQ QELANVVGLN
 361 RKVEESDFEK LTYLRCCLKE TLRLHPPIPL LLHETAEEST VSGYHIPAKS HVIINSFAIG
 421 RDKNSWEDPE TYKPSRFLKE GVPDFKGGNF EFIPFGSGRR SCPGMQLGLY ALEMAVAHLL
 481 HCFTWELPDG MKPSELKMDD IFGLTAPRAN RLVAVPTPRL LCPLY
```

FIG. 86

NAME D105-AD6
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 171

```
   1 TGTGCTTGTG AGTGTGGGAG AAGGCCTTCA ATATGGAGAT ACCATATTAC AGCTTAAAAA
  61 TTGCAATTTC TTCATTTGCA ATTATCTTTG TACTAAGATG GGCATGGAAA ATCTTGAATT
 121 ATGTGTGGTT AAAACCAAAA GAATTGGAGA AATACCTCAG ACAGCAGGGT TTCAAAGGAA
 181 ACTCTTACAA ATTCTTGTTT GGGGATATGA AAGAGATGAA GAAAATGGGT GAAGAAGCTA
 241 TGTCTAAGCC AATCAATTTC TCTCATGACA TGATTTGGCC TAGAGTTATG CCATTCATCC
 301 ACAAAAACCAT CACCAATTAT GGTAAGAATT GTATTGTGTG GTTTGGGCCA AGACCAGCAG
 361 TCCTGATCAC AGACCCGGAA CTTGTAAAGG AGGTGCTAAC GAAGAATTTC GTCTATCAGA
 421 AGCCGCTTGG CAATCCACTC ACAAAGTTGG CAGCAACTGG AATTGCAGGC TATGAAACAG
 481 ATAAATGGGC TACACATAGA AGGCTTCTCA ATCCTGCTTT TCACCTTGAC AAGTTGAAGC
 541 ATATGCTACC TGCATTCCAA TTTACTGCTA GTGAGATGTT GAGCAAATTG GAGAAAGTTG
 601 TTTCACCAAA CGGAACAGAG ATAGATGTGT GGCCATATTT ACAAACTTTG ACAAGTGATG
 661 CCATTTCAAG AACTGCGTTT GGAAGTAGTT ATGAAGAAGG AAGAAAGATT TTTGACCTTC
 721 AAAAAGAACA ACTTTCACTA ATTCTAGAAG TTTCACGCAC AATATATATT CCAGGATGGA
 781 GGTTTTTGCC AACGAAAAGG AACAAAAGGA TGAAGCAAAT ATTTAATGAA GTACGAGCAC
 841 TGGTATTTGG AATTATTAAG AAAAGGATGA GTATGATTGA AAATGGAGAA GCACCTGATG
 901 ATTTATTGGG AATATTATTG GCATCCAATT TAAAAGAAAT CCAACAACAT GGAAACAACA
 961 AGAAATTTGG TATGAGTATT GATGAGGTGA TTGAAGAGTG TAAACTCTTC TATTTTGCTG
1021 GGCAAGAGAC TACTTCATCT TTACTTGTAT GGACTATGAT TTTGTTGTGC AAATATCCTA
1081 ATTGGCAAGA TAAAGCTAGA GAAGAGGTTT TGCAAGTGTT TGGGAGTAGG GAAGTTGACT
1141 ATGACAAGTT GAATCAGCTA AAAATAGTAA CTATGATCTT AAACGAGGTC TTAAGGTTGT
1201 ATCCAGCAGG ATATGTGATT AATCGAATGG TAAACAAAGA AACAAAGTTA GGGAATTTGT
1261 GTTTACCAGC CGGCGTACAG CTCGTGTTAC CAACAATGTT GTTGCAACAT GATACTGAAA
1321 TATGGGGAGA TGATGCAATG GAGTTCAATC CAGAGAGATT TAGTGATGGA ATATCCAAAG
1381 CAACAAAAGG AAAACTTGTG TTTTTTCCAT TTAGTTGGGG TCCAAGAATA TGTATTGGGC
1441 AAAATTTTGC TATGTTAGAG GCTAAAATGG CAATGGCTAT GATTCTGAAA ACCTATGCAT
1501 TTGAACTCTC TCCATCTTAT GCTCATGCTC CTCATCCACT ACTACTTCAA CCTCAATATG
1561 GTGCTCAATT AATTTTGTAC AAGTTGTAGA TATGGTCAAT TTGGAACTTG TTATGGAACT
1621 TTTATCATTG TAATCAACCA TATTGAGGGA ACATGGTTTG AGGTTAAATC CTCGTGTGTG
1681 TGTC
```

SEQ. ID. NO. 172

```
   1 MEIPYYSLKI AISSFAIIFV LRWAWKILNY VWLKPKELEK YLRQQGFKGN SYKFLFGDMK
  61 EMKKMGEEAM SKPINFSHDM IWPRVMPFIH KTITNYGKNC IVWFGPRPAV LITDPELVKE
 121 VLTKNFVYQK PLGNPLTKLA ATGIAGYETD KWATHRRLLN PAFHLDKLKH MLPAFQFTAS
 181 EMLSKLEKVV SPNGTEIDVW PYLQTLTSDA ISRTAFGSSY EEGRKIFDLQ KEQLSLILEV
 241 SRTIYIPGWR FLPTKRNKRM KQIFNEVRAL VFGIIKKRMS MIENGEAPDD LLGILLASNL
 301 KEIQQHGNNK KFGMSIDEVI EECKLFYFAG QETTSSLLVW TMILLCKYPN WQDKAREEVL
 361 QVFGSREVDY DKLNQLKIVT MILNEVLRLY PAGYVINRMV NKETKLGNLC LPAGVQLVLP
 421 TMLLQHDTEI WGDDAMEFNP ERFSDGISKA TKGKLVFFPF SWGPRICIGQ NFAMLEAKMA
 481 MAMILKTYAF ELSPSYAHAP HPLLLQPQYG AQLILYKL
```

FIG. 87

```
NAME          D109-AH8 (14,1697)
ORGANISM      NICOTIANA TABACUM
SEQ. ID. NO. 173
     1 CCAGCACCAA GACATGGAGA ATTCCTGGGT AGTTTTAGCC TTAACAGGCC TTCTTACATT
    61 AGTTTTTCTC TCAAAGTTTC TTCATAGTCC TCGTCGTAAA CAAAATCTTC CACCAGGTCC
   121 AAAACCATGG CCTATTGTTG GCAATATACA TCTTCTTGGT TCCACCCCTC ACAGATCCCT
   181 TCACGAACTT GCAAAAAGAT ACGGAGATTT AATGCTACTA AAGTTCGGTT CGCGCAATGT
   241 CCTTATTTTA TCCTCCCCAG ATATGGCTAG AGAATTCTTG AAAACAAATG ATGCCATTTG
   301 GGCTTCTCGC CCTGAGCTTG CCGCTGGTAA ATATACTGCT TATAATTATT GCGACATGAC
   361 ATGGGCACGT TATGGACCCT TTTGGAGACA AGCAAGGAGG ATCTATCTCA ACGAGATTTT
   421 CAATCCTAAA CGTTTGGATT CATTTGAGTA CATTCGCATA GAGGAAAGGC ATAATTTGAT
   481 TTCACGTCTT TTTGTTCTCT CTGGGAAGCC AATTCTTCTT AGAGACCATT TAACTCGGTA
   541 CACTCTTACA AGTATAAGTA GAACAGTATT GAGTGGAAAA TATTTTAGCG AGTCACCTGG
   601 CCAAAATTCA ATGATAACTT TGAAACAATT GCAGGATATG CTTGATAAGT GGTTTTTGCT
   661 TAATGGTGTG ATCAATATTG GGGACTGGAT ACCTTGGCTT GCTTTCTTGG ATTTGCAGGG
   721 TTATGTCAAG CAAATGAAGG AGTTGCATAG GAACTTCGAC AAATTTCATA ACTTTGTGCT
   781 AGATGATCAC AAGGCTAATA GGGGAGAGAA GAACTTTGTG CCAAGAGACA TGGTCGATGT
   841 TTTGCTGCAG CAAGCTGAGG ATCCTAATCT TGAGGTCAAA CTCACCAATG ATTGTGTCAA
   901 GGGTCTAATG CAGGACTTAT TGGCTGGCGG CACGGACACC TCAGCAACAA CCGTTGAATG
   961 GGCTTTTTAT GAACTTCTTA GACAACCTAA GATTATGAAG AAAGCACAAC AAGAGCTAGA
  1021 CCTTGTCATT TCACAGGACA GATGGGTTCA AGAAAAAGAT TACACTCAAC TCCCTTACAT
  1081 TGAGTCAATC ATCAAGGAAA CATTGAGGCT TCACCCAGTA AGCACCATGC TTCCACCGCG
  1141 CATTGCCTTG GAGGATTGTC ATGTAGCAGG CTATGACATA CCTAAAGGTA CAATTTTAAT
  1201 TGTGAACACT TGGAGTATTG GAAGAAATTC ACAGCATTGG GAGTCACCAG AAGAATTCCT
  1261 TCCGGAGAGG TTTGAAGGGA AGAATATTGG TGTCACAGGA CAACATTTTG CGCTCTTGCC
  1321 ATTTGGCGCG GGCCGGAGAA AGTGCCCAGG ATACAGTCTT GGGATTCGTA TAATTAGGGC
  1381 AACTTTAGCT AACTTGTTGC ATGGATTCAA CTGGAGATTG CCTAATGGTA TGAGTCCAGA
  1441 AGACATTAGC ATGGAAGAGA TTTATGGGCT AATTACACAC CCCAAAGTCG CACTTGACGT
  1501 GATGATGGAG CCTCGACTTC CCAACCATCT TTACAAATAG TGGATAATTA AAACCATTAA
  1561 AATCGTTTTG TTATATGCAT GTCTCATATT TGTAGTGGTC AAAATGTTTG TTTTCTATCA
  1621 TGGATGTTCA GTGCGAGGTT GGGAATTTCA AGTCATTAAC GTGTGAAAAT ATTTTAAATT
  1681 TAAAAAAAAA AAAAAAA

SEQ. ID. NO. 174
     1 MENSWVVLAL TGLLTLVFLS KFLHSPRRKQ NLPPGPKPWP IVGNIHLLGS TPHRSLHELA
    61 KRYGDLMLLK FGSRNVLILS SPDMAREFLK TNDAIWASRP ELAAGKYTAY NYCDMTWARY
   121 GPFWRQARRI YLNEIFNPKR LDSFEYIRIE ERHNLISRLF VLSGKPILLR DHLTRYTLTS
   181 ISRTVLSGKY FSESPGQNSM ITLKQLQDML DKWFLLNGVI NIGDWIPWLA FLDLQGYVKQ
   241 MKELHRNFDK FHNFVLDDHK ANRGEKNFVP RDMVDVLLQQ AEDPNLEVKL TNDCVKGLMQ
   301 DLLAGGTDTS ATTVEWAFYE LLRQPKIMKK AQQELDLVIS QDRWVQEKDY TQLPYIESII
   361 KETLRLHPVS TMLPPRIALE DCHVAGYDIP KGTILIVNTW SIGRNSQHWE SPEEFLPERF
   421 EGKNIGVTGQ HFALLPFGAG RRKCPGYSLG IRIIRATLAN LLHGFNWRLP NGMSPEDISM
   481 EEIYGLITHP KVALDVMMEP RLPNHLYK
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FIG. 88

NAME D110-AF12 (166,1631)
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 175

```
   1 ACTGTTCAAA TCACAGTAAC AGCATCTTGT GCTGCCATAA TAATTACTCT AGTGGTGTGT
  61 ATATGGAGAG TGCTGAATTG GGTTTGGTTC AGACCAAAGA AGCTGGAAAA GCTACTGAGG
 121 AAACAAGGTC TCAAAGGCAA TTCCTACAGG ATTTTGTATG GGGATATGAA GGAGCTTTCT
 181 GGTATGATTA AGGAAGCTAA CTCCAAACCC ATGAATCTTT CTGATGATAT TGCCCCAAGA
 241 TTGGTCCCTT TCTTTCTTGA TACCATCAAG AAATATGGGA AAAAATCCTT TGTATGGTTG
 301 GGTCCAAAAC CGCTGGTTTT TGTCATGGAC CCCGAGCTTA TAAAGGAAGT ATTCTCCAAA
 361 AACTATCTGT ATCAAAAGCC TCATTCAAAT CCATTAACCA AGTTACTGGC ACAAGGACTT
 421 GTAAGCCAAG AGGAAGACAA ATGGGCCAAA CATAGAAAAA TCGTCACTCC TGCCTTCCAC
 481 CTGGAGAAGC TAAAGCATAT GCTTCCAGCT TTTTGTTTGA GCTGTACTGA GATGCTGAGC
 541 AAATGGGAAG ACATTGTTGC AGTTGAGGGC TCACATGAGA TAGATATATG GCCTGGCCTT
 601 CAACAATTAA CTAGTGATGT GATCTCTCGG ACAGCCTTTG GCAGTAGCTA TGAAGCAGGT
 661 AGAAGGATAT TTGAACTTCA AAAGGAACAA GCTCAATTTC TTATGGAAGC TATACGCTCC
 721 GTTTATATTC CAGGCTGGAG GTTTTTGCCA ACAAAGAGGA ACAGAAGAAT GAAGGAAATT
 781 GAAAAGGATG TTCAAGCCTT AGTTAGAGGT ATTATTGATA AAAGAGTAAA GTCAATGAAA
 841 GCAGGAGAGG TGAATAATGA GGATCTGCTT GGTATATTGC TGGAATCTAA TTTTAAAGAA
 901 ATTGAACAGC ATGGAAACAA GGATTTTGGA ATGAGCATTG AAGAAGTCAT TCAAGAATGC
 961 AAGTTATTCT ATTTTGCTGG CCAAGAAACT ACATCAGTGT TGCTTGTATG GACTCTAATA
1021 TTGCTGAGCA GGCATCAGGA TTGGCAAGCA CTGGCCAGAG AAGAGGTGTT GCAAGTCTTT
1081 GGGAATCAGA AACCAGATTT TGATGGATTA AATCGTCTAA AAATTGTTAC AATGATCTTG
1141 TACGAGTCTT TAAGGCTCTA TCCCCCAGTA GTGACACTTA CCCGAAGGCC TAAGGAAGAC
1201 ACTGTATTAG GAGATGTATC TCTACCAGCA GGTGTGTTAA TCTCCTTACC AGTGATCTTA
1261 TTGCATCACG ACGAAGAGAT ATGGGGTAAA GATGCAAAGA AGTTCAAGCC AGAGAGATTC
1321 AGAGATGGAG TCTCAAGTGC AACAAAGGGT CAAGTCACTT TTTTCCCATT TACTTGGGGT
1381 CCCAGAATAT GCATTGGACA AAATTTTGCC ATGTTAGAAG CAAAGACTAC TTTGGCTATG
1441 ATCCTACAAC GCTTCTCCTT TGAACTGTCT CCATCTTATG CACATGCTCC TCAGTCCATA
1501 ATAACTTTGC AACCCCAGTA TGGTGCTCCA CTTATTTTGC ATAAAATATA GTTTATTACT
1561 TGTAAGTAGT GTCTCGTTTT ATGTTAAGCA TGAGTCCAAA ATGTTAAGGC TTGTAGAACT
1621 GCAAAATGGG A
```

SEQ. ID. NO. 176

```
   1 MKELSGMIKE ANSKPMNLSD DIAPRLVPFF LDTIKKYGKK SFVWLGPKPL VFVMDPELIK
  61 EVFSKNYLYQ KPHSNPLTKL LAQGLVSQEE DKWAKHRKIV TPAFHLEKLK HMLPAFCLSC
 121 TEMLSKWEDI VAVEGSHEID IWPGLQQLTS DVISRTAFGS SYEAGRRIFE LQKEQAQFLM
 181 EAIRSVYIPG WRFLPTKRNR RMKEIEKDVQ ALVRGIIDKR VKSMKAGEVN NEDLLGILLE
 241 SNFKEIEQHG NKDFGMSIEE VIQECKLFYF AGQETTSVLL VWTLILLSRH QDWQALAREE
 301 VLQVFGNQKP DFDGLNRLKI VTMILYESLR LYPPVVTLTR RPKEDTVLGD VSLPAGVLIS
 361 LPVILLHHDE EIWGKDAKKF KPERFRDGVS SATKGQVTFF PFTWGPRICI GQNFAMLEAK
 421 TTLAMILQRF SFELSPSYAH APQSIITLQP QYGAPLILHK I
```

FIG. 89

```
NAME            D112-AA5
ORGANISM        NICOTIANA TABACUM
SEQ. ID. NO. 177
       1 ATTTATCTCT GAAAATGCAA TTCTTCAGCT TGGTTTCCAT TTTCCTATTC CTATCTTTCC
      61 TATTTTTGTT GAGGAAATGG AAGAACTCCA ATAGCCAAAG CAAAAAATTG CCACCAGGTC
     121 CATGGAAAAT ACCAATACTA GGAAGTATGC TTCATATGAT TGGTGGAGAA CCGCACCATG
     181 TCCTTAGAGA TTTAGCCAAA AAAGATGGAC CACTTATGCA CCTTCAGTTA GGTGAAATTT
     241 CTGCAGTTGT GGTTACTTCT AGGGACATGG CAAAAGAAGT GCTAAAAACT CATGACGTCG
     301 TTTTTGCATC TAGGCCTAAA ATTGTAGCCA TGGACATTAT CTGTTATAAC CAGTCCGACA
     361 TTGCCTTTAG CCCTTATGGC GACCACTGGA GACAAATGCG TAAAATTTGT GTCATGGAAC
     421 TTCTCAATGC AAAGAATGTT CGGTCTTTCA GCTCCATCAG ACGTGATGAA GTCGTTCGTC
     481 TCATTGACTC TATCCGGTCA GATTCTTCTT CAGGTGAGCT AGTTAATTTT ACGCAGAGGA
     541 TCATTTGGTT TGCAAGCTCC ATGACGTGTA GATCAGCATT TGGGCAAGTA CTCAAGGGGC
     601 AAGACATATT TGCCAAAAAG ATCAGAGAAG TAATAGGATT AGCAGAAGGC TTTGATGTGG
     661 TAGACATCTT CCCTACATAC AAGTTTCTTC ATGTTCTCAG TGGGATGAAG CGTAAACTTT
     721 TGAATGCCCA CCTTAAGGTA GACGCCATTG TTGAGGATGT CATCAACGAG CACAAGAAAA
     781 ATCTTGCAGC TGGCAAGAGT AATGGCGCAT TAGGAGGCGA AGATCTAATT GATGTCCTAC
     841 TGAGACTTAT GAATGACACA AGTCTTCAAT TTCCCATCAC CAACGACAAT ATCAAAGCTG
     901 TTGTTGTTGA CATGTTTGCT GCCGGAACAG AAACTTCATC AACAACAACT GTATGGGCCA
     961 TGGCTGAAAT GATGAAGAAT CCAAGTGTAT TCGCCAAAGC TCAAGCAGAA GTGCGAGAAG
    1021 CCTTTAGGGA CAAAGTATCT TTTGATGAAA ATGATGTGGA GGAGCTGAAA TACTTAAAGT
    1081 TAGTCATTAA AGAAACTTTG AGACTTCATC CACCGTCTCC ACTTTTGGTC CCAAGAGAAT
    1141 GCAGGGAAGA TACGGATATA AACGGCTACA CTATTCCTGC AAAGACCAAA GTTATGGTTA
    1201 ATGTTTGGGC ATTGGGAAGA GATCCAAAAT ATTGGGATGA CGCGGAAAGC TTTAAGCCAG
    1261 AGAGATTTGA GCAATGTTCT GTAGATATTT TTGGTAATAA TTTTGAGTTT CTTCCCTTTG
    1321 GCGGGGGACG GAGAATTTGT CCTGGAATGT CATTTGGTTT AGCTAATCTT TACTTACCAT
    1381 TGGCTCAATT ACTCTATCAC TTTGACTGGA AACTCCCAAC CGGAATCAAG CCAAGAGACT
    1441 TGGACTTGAC CGAATTATCG GGAATAACTA TTGCTAGAAA GGGTGACCTT TACTTAAATG
    1501 CTACTCCTTA TCAACCTTCT CGAGAGTAAT TTACTATTGG CATAAACATT TTAAATTTCC
    1561 TTCATCAACC TC

SEQ. ID. NO. 178
       1 MQFFSLVSIF LFLSFLFLLR KWKNSNSQSK KLPPGPWKIP ILGSMLHMIG GEPHHVLRDL
      61 AKKDGPLMHL QLGEISAVVV TSRDMAKEVL KTHDVVFASR PKIVAMDIIC YNQSDIAFSP
     121 YGDHWRQMRK ICVMELLNAK NVRSFSSIRR DEVVRLIDSI RSDSSSGELV NFTQRIIWFA
     181 SSMTCRSAFG QVLKGQDIFA KKIREVIGLA EGFDVVDIFP TYKFLHVLSG MKRKLLNAHL
     241 KVDAIVEDVI NEHKKNLAAG KSNGALGGED LIDVLLRLMN DTSLQFPITN DNIKAVVVDM
     301 FAAGTETSST TTVWAMAEMM KNPSVFAKAQ AEVREAFRDK VSFDENDVEE LKYLKLVIKE
     361 TLRLHPPSPL LVPRECREDT DINGYTIPAK TKVMVNVWAL GRDPKYWDDA ESFKPERFEQ
     421 CSVDIFGNNF EFLPFGGGRR ICPGMSFGLA NLYLPLAQLL YHFDWKLPTG IKPRDLDLTE
     481 LSGITIARKG DLYLNATPYQ PSRE
```

FIG. 90

NAME D120-AH4
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 179

```
   1 ATAATGCTTT CTCCCATAGA AGCCATTGTA GGACTAGTAA CCTTCACATT TCTCTTCTTC
  61 TTCCTATGGA CAAAAAAATC TCAAAAACCT TCAAAACCCT TACCACCGAA AATCCCCGGA
 121 GGATGGCCGG TAATCGGCCA TCTTTTCCAC TTCAATGACG ACGGCGACGA CCGTCCATTA
 181 GCTCGAAAAC TCGGAGACTT AGCTGACAAA TACGGCCCCG TTTTCACTTT TCGGCTAGGC
 241 CTTCCCCTTG TCTTAGTTGT AAGCAGTTAC GAAGCTGTAA AAGACTGTTT CTCTACAAAT
 301 GACGCCATTT TTTCCAATCG TCCAGCTTTT CTTTACGGCG ATTACCTTGG CTACAATAAT
 361 GCCATGCTAT TTTTGGCCAA TTACGGACCT TACTGGCGAA AAAATCGAAA ATTAGTTATT
 421 CAGGAAGTTC TCTCCGCTAG TCGTCTCGAA AAATTCAAAC ACGTGAGATT TGCAAGAATT
 481 CAAGCGAGCA TTAAGAATTT ATATACTCGA ATTGATGGAA ATTCGAGTAC GATAAATTTA
 541 ACTGATTGGT TAGAAGAATT GAATTTTGGT CTGATCGTGA AGATGATCGC TGGAAAAAAT
 601 TATGAATCCG GTAAAGGAGA TGAACAAGTG GAGAGATTTA AGAAAGCGTT TAAGGATTTT
 661 ATGATTTTAT CAATGGAGTT TGTGTTATGG GATGCATTTC CAATTCCATT ATTTAAATGG
 721 GTGGATTTTC AAGGGCATGT TAAGGCTATG AAAAGGACTT TTAAAGATAT AGATTCTGTT
 781 TTTCAGAATT GGTTAGGGGA ACATATTAAT AAAAGAGAAA AAATGGAGGT TAATGCAGAA
 841 GGGAATGAAC AAGATTTCAT TGATGTGGTG CTTTCAAAAA TGAGTAATGA ATATCTTGGT
 901 GAAGGTTACT CTCGTGATAC TGTCATTAAA GCAACGGTGT TTAGTTTGGT CTTGGATGCA
 961 GCAGACACAG TTGCTCTTCA CATAAATTGG GGAATGGCAT TATTGATAAA CAATCAAAAG
1021 GCCTTGACGA AAGCACAAGA AGAGATAGAC ACAAAAGTTG GTAAGGACAG ATGGGTAGAA
1081 GAGAGTGATA TTAAGGATTT GGTATACCTC CAAGCTATTG TTAAAGAAGT GTTACGATTA
1141 TATCCACCAG GACCTTTGTT AGTACCACAC GAAAATGTAG AAGATTGTGT TGTTAGTGGA
1201 TATCACATTC CTAAAGGGAC AAGATTATTC GCAAACGTCA TGAAACTGCT ACGTGATCCT
1261 AAACTCTGGC CTGATCCTGA TACTTTCGAT CCAGAGAGAT TCATTGCTAC TGATATTGAC
1321 TTTCGTGGTC AGTACTATAA GTATATCCCG TTTGGTTCTG GAAGACGATC TTGTCCAGGG
1381 ATGACTTATG CATTGCAAGT GGAACACTTA ACAATGGCAC ATTTGATCCA AGGTTTCAAT
1441 TACAGAACTC CAAATGACGA GCCCTTGGAT ATGAAGGAAG GTGCAGGCAT AACTATACGT
1501 AAGGTAAATC CTGTGGAACT GATAATAGCG CCTCGCCTGG CACCTGAGCT TTATTAAAAC
1561 CTAAGATCTT TCATCTTGGT TGATCATTGT ATAATACTCC TAAATGGATA TTCATTTACC
1621 TTTTATCAAT TAA
```

SEQ. ID. NO. 180

```
   1 MLSPIEAIVG LVTFTFLFFF LWTKKSQKPS KPLPPKIPGG WPVIGHLFHF NDDGDDRPLA
  61 RKLGDLADKY GPVFTFRLGL PLVLVVSSYE AVKDCFSTND AIFSNRPAFL YGDYLGYNNA
 121 MLFLANYGPY WRKNRKLVIQ EVLSASRLEK FKHVRFARIQ ASIKNLYTRI DGNSSTINLT
 181 DWLEELNFGL IVKMIAGKNY ESGKGDEQVE RFKKAFKDFM ILSMEFVLWD AFPIPLFKWV
 241 DFQGHVKAMK RTFKDIDSVF QNWLGEHINK REKMEVNAEG NEQDFIDVVL SKMSNEYLGE
 301 GYSRDTVIKA TVFSLVLDAA DTVALHINWG MALLINNQKA LTKAQEEIDT KVGKDRWVEE
 361 SDIKDLVYLQ AIVKEVLRLY PPGPLLVPHE NVEDCVVSGY HIPKGTRLFA NVMKLLRDPK
 421 LWPDPDTFDP ERFIATDIDF RGQYYKYIPF GSGRRSCPGM TYALQVEHLT MAHLIQGFNY
 481 RTPNDEPLDM KEGAGITIRK VNPVELIIAP RLAPELY
```

FIG. 91

NAME D121-AA8
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 181

```
   1 AATCCATAAT GCTTTCTCCC ATAGAAGCCA TTGTAGGACT AGTAACCTTC ACATTTCTCT
  61 TCTTCTTCCT ATGGACAAAA AAATCTCAAA AACCTTCAAA ACCCTTACCA CCGAAAATCC
 121 CCGGAGGATG GCCGGTAATC GGCCATCTTT TCCACTTCAA TGACGACGGC GACGACCGTC
 181 CATTAGCTCG AAAACTCGGA GACTTAGCTG ACAAATACGG CCCCGTTTTC ACTTTTCGGC
 241 TAGGCCTTCC CCTTGTCTTA GTTGTAAGCA GTTACGAAGC TGTAAAAGAC TGTTTCTCTA
 301 CAAATGACGC CATTTTTTCC AATCGTCCAG CTTTTCTTTA CGGCGATTAC CTTGGCTACA
 361 ATAATGCCAT GCTATTTTTG GCCAATTACG GACCTTACTG GCGAAAAAAT CGAAAATTAG
 421 TTATTCAGGA AGTTCTCTCC GCTAGTCGTC TCGAAAAATT CAAACACGTG AGATTTGCAA
 481 GAATTCAAGC GAGCATTAAG AATTTATATA CTCGAATTGA TGGAAATTCG AGTACGATAA
 541 ATTTAACTGA TTGGTTAGAA GAATTGAATT TTGGTCTGAT CGTGAAGATG ATCGCTGGAA
 601 AAAATTATGA ATCCGGTAAA GGAGATGAAC AAGTGGAGAG ATTTAAGAAA GCGTTTAAGG
 661 ATTTTATGAT TTTATCAATG GAGTTTGTGT TATGGGATGC ATTTCCAATT CCATTATTTA
 721 AATGGGTGGA TTTTCAAGGG CATGTTAAGG CTATGAAAAG GACTTTTAAA GATATAGATT
 781 CTGTTTTTCA GAATTGGTTA GAGGAACATA TTAATAAAAG AGAAAAAATG GAGGTTAATG
 841 CAGAAGGGAA TGAACAAGAT TTCATTGATG TGGTGCTTTC AAAAATGAGT AATGAATATC
 901 TTGGTGAAGG TTACTCTCGT GATACTGTCA TTAAAGCAAC GGTGTTTAGT TTGGTCTTGG
 961 ATGCAGCAGA CACAGTTGCT CTTCACATAA ATTGGGGAAT GGCATTATTG ATAAACAATC
1021 AAAAGGCCTT GACGAAAGCA CAAGAAGAGA TAGACACAAA AGTTGGTAAG GACAGATGGG
1081 TAGAAGAGAG TGATATTAAG GATTTGGTAT ACCTCCAAGC TATTGTTAAA GAAGTGTTAC
1141 GATTATATCC ACCAGGACCT TTGTTAGTAC CACACGAAAA TGTAGAAGAT TGTGTTGTTA
1201 GTGGATATCA CATTCCTAAA GGGACAAGAT TATTCGCAAA CGTCATGAAA CTGCAACGTG
1261 ATCCTAAACT CTGGTCTGAT CCTGATACTT TCGATCCAGA GAGATTCATT GCTACTGATA
1321 TTGACTTTCG TGGTCAGTAC TATAAGTATA TCCCGTTTGG TTCTGGAAGA CGATCTTGTC
1381 CAGGGATGAC TTATGCATTG CAAGTGGAAC ACTTAACAAT GGCACATTTG ATCCAAGGTT
1441 TCAATTACAG AACTCCAAAT GACGAGCCCT TGGATATGAA GGAAGGTGCA GGCATAACTA
1501 TACGTAAGGT AAATCCTGTG GAACTGATAA TAGCGCCTCG CCTGGCACCT GAGCTTTATT
1561 AAAACCTAAG ATCATCTTGC TTGAT
```

SEQ. ID. NO. 182

```
   1 MLSPIEAIVG LVTFTFLFFF LWTKKSQKPS KPLPPKIPGG WPVIGHLFHF NDDGDDRPLA
  61 RKLGDLADKY GPVFTFRLGL PLVLVVSSYE AVKDCFSTND AIFSNRPAFL YGDYLGYNNA
 121 MLFLANYGPY WRKNRKLVIQ EVLSASRLEK FKHVRFARIQ ASIKNLYTRI DGNSSTINLT
 181 DWLEELNFGL IVKMIAGKNY ESGKGDEQVE RFKKAFKDFM ILSMEFVLWD AFPIPLFKWV
 241 DFQGHVKAMK RTFKDIDSVF QNWLEEHINK REKMEVNAEG NEQDFIDVVL SKMSNEYLGE
 301 GYSRDTVIKA TVFSLVLDAA DTVALHINWG MALLINNQKA LTKAQEEIDT KVGKDRWVEE
 361 SDIKDLVYLQ AIVKEVLRLY PPGPLLVPHE NVEDCVVSGY HIPKGTRLFA NVMKLQRDPK
 421 LWSDPDTFDP ERFIATDIDF RGQYYKYIPF GSGRRSCPGM TYALQVEHLT MAHLIQGFNY
 481 RTPNDEPLDM KEGAGITIRK VNPVELIIAP RLAPELY
```

FIG. 92

NAME D122-AF10
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 183

```
   1 CTAAAACTCC ATAATGGTTT CTCCCGTAGA AGCCATTGTA GGACTAGTAA CCCTTACACT
  61 TCTCTTCTAC TTCCTATGGC CCAAAAAATT TCAAATACCT TCAAAACCAT TACCACCGAA
 121 AATTCCCGGA GGGTGGCCGG TAATCGGCCA TCTTTTCTAC TTCGATGATG ACGGCGACGA
 181 CCGTCCATTA GCTCGAAAAC TCGGAGACTT AGCTGACAAA TACGGCCCGG TTTTCACTTT
 241 CCGGCTAGGC CTTCCGCTTG TGTTAATTGT AAGCAGTTAC GAAGCTGTAA AAGACTGCTT
 301 CTCTACAAAT GACGCCATTT TCTCCAATCG TCCAGCTTTT CTTTACGGTG AATACCTTGG
 361 CTACAATAAT GCCATGCTAT TTTTGACAAA ATACGGACCT TATTGGCGAA AAAATAGAAA
 421 ATTAGTCATT CAGGAAGTTC TCTCTGCTAG TCGTCTCGAA AAATTGAAGC ACGTGAGATT
 481 TGGTAAAATT CAAACGAGCA TTAAGAGTTT ATACACTCGA ATTGATGGAA ATTCGAGTAC
 541 GATAAATCTA ACTGATTGGT TAGAAGAATT GAATTTTGGT CTGATCGTGA AAATGATCGC
 601 TGGGAAAAAT TATGAATCCG GTAAAGGAGA TGAACAAGTG GAGAGATTTA GGAAAGCGTA
 661 TAAGGATTTT ATAATTTTAT CAATGGAGTT TGTGTTATGG GATGCTTTTC CAATTCCATT
 721 GTTCAAATGG GTGGATTTTC AAGGCTATGT TAAGGCCATG AAAAGGACAT TTAAGGATAT
 781 AGATTCTGTT TTTCAGAATT GGTTAGAGGA ACATGTCAAG AAAAGAGAAA AAATGGAGGT
 841 TAATGCACAA GGGAATGAAC AAGATTTCAT TGATGTGGTG CTTTCAAAAA TGAGTAATGA
 901 ATATCTTGAT GAAGGTTACT CTCGTGATAC TGTCATAAAA GCAACAGTGT TTAGTTTGGT
 961 CTTGGATGCT GCGGACACAG TTGCTCTTCA CATGAATTGG GGAATGGCAT TACTGATAAA
1021 CAATCAACAT GCCTTGAAGA AAGCACAAGA AGAGATCGAT AAGAAAGTTG GTAAGGAAAG
1081 ATGGGTAGAA GAGAGTGATA TTAAGGATTT GGTCTACCTC CAAGCTATTG TTAAAGAAGT
1141 GTTACGATTA TATCCACCAG GACCTTTATT AGTACCTCAT GAAAATGTAG AGGATTGTGT
1201 TGTTAGTGGA TATCACATTC CTAAAGGGAC TAGACTATTC GCGAACGTTA TGAAATTGCA
1261 GCGCGATCCT AAACTCTGGT CAAATCCTGA TAAGTTTGAT CCAGAGAGAT TCTTCGCTGA
1321 TGATATTGAC TACCGTGGTC AGCACTATGA GTTTATCCCA TTTGGTTCTG GAAGACGATC
1381 TTGTCCGGGG ATGACTTATG CATTACAAGT GGAACACCTA ACAATAGCAC ATTTGATCCA
1441 GGGTTTCAAT TACAAAACTC CAAATGACGA GCCCTTGGAT ATGAAGGAAG GTGCAGGATT
1501 AACTATACGT AAAGTAAATC CTGTAGAAGT GACAATTACG GCTCGCCTGG CACCTGAGCT
1561 TTATTAAAAC CTTAGATGTT TTATCTTGAT TGTACTAATA TATATATGCA GAAAAAATTG
```

SEQ. ID. NO. 184

```
   1 MVSPVEAIVG LVTLTLLFYF LWPKKFQIPS KPLPPKIPGG WPVIGHLFYF DDDGDDRPLA
  61 RKLGDLADKY GPVFTFRLGL PLVLIVSSYE AVKDCFSTND AIFSNRPAFL YGEYLGYNNA
 121 MLFLTKYGPY WRKNRKLVIQ EVLSASRLEK LKHVRFGKIQ TSIKSLYTRI DGNSSTINLT
 181 DWLEELNFGL IVKMIAGKNY ESGKGDEQVE RFRKAYKDFI ILSMEFVLWD AFPIPLFKWV
 241 DFQGYVKAMK RTFKDIDSVF QNWLEEHVKK REKMEVNAQG NEQDFIDVVL SKMSNEYLDE
 301 GYSRDTVIKA TVFSLVLDAA DTVALHMNWG MALLINNQHA LKKAQEEIDK KVGKERWVEE
 361 SDIKDLVYLQ AIVKEVLRLY PPGPLLVPHE NVEDCVVSGY HIPKGTRLFA NVMKLQRDPK
 421 LWSNPDKFDP ERFFADDIDY RGQHYEFIPF GSGRRSCPGM TYALQVEHLT IAHLIQGFNY
 481 KTPNDEPLDM KEGAGLTIRK VNPVEVTITA RLAPELY
```

FIG. 93

NAME D128-AB7
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 185

```
   1 CGAGGCTCCC CACCAAAAAA TCATTTCTCT CGTCTAAAAT GGATCTTCTC TTACTAGAGA
  61 AGACCTTAAT TGGTCTTTTC TTTGCCATTT TAATCGCTTT AATTGTCTCT AAACTTCGTT
 121 CAAAGCGTTT TAAGCTTCCT CCAGGACCAA TTCCAGTACC AGTTTTTGGT AATTGGCTTC
 181 AAGTTGGTGA TGATTTAAAC CACAGAAATC TTACTGATTA TGCCAAAAAA TTTGGCGATC
 241 TTTTCTTGTT AAGAATGGGT CAACGTAACT TAGTTGTTGT GTCATCTCCT GAATTAGCTA
 301 AAGAAGTTTT ACACACACAA GGTGTTGAAT TTGGTTCAAG AACAAGAAAT GTTGTGTTTG
 361 ATATTTTTAC TGGAAAAGGT CAAGATATGG TTTTTACTGT ATATGGTGAA CATTGGAGAA
 421 AAATGAGGAG AATTATGACT GTACCATTTT TTACTAATAA AGTTGTGCAA CAGTATAGAG
 481 GGGGGTGGGA GTTTGAGGTG GCAAGTGTAA TTGAGGATGT GAAAAAAAAT CCTGAATCTG
 541 CTACTAATGG GATCGTATTA AGGAGGAGAT TACAATTAAT GATGTATAAT AATATGTTTA
 601 GGATTATGTT TGATAGGAGA TTTGAGAGTG AAGATGATCC TTTGTTTGTT AAGCTTAAGG
 661 CTTTGAATGG TGAAAGGAGT AGATTGGCTC AAAGTTTTGA GTATAATTAT GGTGATTTTA
 721 TTCCAATTTT GAGGCCTTTT TTGAGAGGTT ATTTGAAGAT CTGTAAAGAA GTTAAGGAGA
 781 AGAGGCTGCA GCTTTTCAAA GATTACTTTG TTGATGAAAG AAAGAAGCTT TCAAATACCA
 841 AGAGCTCGGA CAGCAATGCC CTAAAATGTG CGATTGATCA CATTCTTGAG GCTCAACAGA
 901 AGGGAGAGAT CAATGAGGAC AACGTTCTTT ACATTGTTGA AAACATCAAT GTTGCTGCAA
 961 TTGAAACAAC ATTATGGTCA ATTGAGTGGG GTATCGCCGA GCTAGTCAAC CACCCTCACA
1021 TCCAAAAGAA ACTGCGCGAC GAGATTGACA CAGTTCTTGG ACCAGGAGTG CAAGTGACTG
1081 AACCAGACAC CCACAAGCTT CCATACCTTC AGGCTGTGAT CAAGGAGGCA CTTCGTCTCC
1141 GTATGGCAAT TCCTCTATTA GTCCCACACA TGAACCTTCA CGACGCAAAG CTTGGCGGGT
1201 TTGATATTCC AGCAGAGAGC AAAATCTTGG TTAACGCTTG GTGGTTAGCT AACAACCCGG
1261 CTCATTGGAA GAAACCCGAA GAGTTCAGAC CCGAGAGGTT CTTTGAAGAG GAGAAGCATG
1321 TTGAGGCCAA TGGCAATGAC TTCAGATATC TTCCGTTTGG CGTTGGTAGG AGGAGCTGCC
1381 CTGGAATTAT ACTTGCATTG CCAATTCTTG GCATCACTTT GGGACGTTTG GTTCAGAACT
1441 TTGAGCTGTT GCCTCCTCCA GGCCAGTCGA AGCTCGACAC CACAGAGAAA GGTGGACAGT
1501 TCAGTCTCCA CATTTTGAAG CATTCCACCA TTGTGTTGAA ACCAAGGTCT TTCTGAACTT
1561 TGTGATCTTA TTAATTAAGG GGTTCTGAAG AAATTTGATA GTGTTGGATA TTAAGGGCGA
1621 ATT
```

SEQ. ID. NO. 186

```
   1 MDLLLLEKTL IGLFFAILIA LIVSKLRSKR FKLPPGPIPV PVFGNWLQVG DDLNHRNLTD
  61 YAKKFGDLFL LRMGQRNLVV VSSPELAKEV LHTQGVEFGS RTRNVVFDIF TGKGQDMVFT
 121 VYGEHWRKMR RIMTVPFFTN KVVQQYRGGW EFEVASVIED VKKNPESATN GIVLRRRLQL
 181 MMYNNMFRIM FDRRFESEDD PLFVKLKALN GERSRLAQSF EYNYGDFIPI LRPFLRGYLK
 241 ICKEVKEKRL QLFKDYFVDE RKKLSNTKSS DSNALKCAID HILEAQQKGE INEDNVLYIV
 301 ENINVAAIET TLWSIEWGIA ELVNHPHIQK KLRDEIDTVL GPGVQVTEPD THKLPYLQAV
 361 IKEALRLRMA IPLLVPHMNL HDAKLGGFDI PAESKILVNA WWLANNPAHW KKPEEFRPER
 421 FFEEEKHVEA NGNDFRYLPF GVGRRSCPGI ILALPILGIT LGRLVQNFEL LPPPGQSKLD
 481 TTEKGGQFSL HILKHSTIVL KPRSF
```

FIG. 94

NAME D129-AD10
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 187

```
   1 CAACACGCTT ACTATCTCCT AAATCTCCAC TCAAAAACAA AGAAGAGAAA GATTTAAAAC
  61 TAATAATTAT GAAAGAGATG GTGCAAAACA ATATGAGCAC TTCTCTTCTT GAAACTTTAC
 121 AAGCTACGCC CATGATATTC TACTTCATCG TCCCTCTCTT CTGCTTATTC CTTCTCTCCA
 181 AATCTCGCCG TAAACGTTTG CCTCCAGGTC CAACTGGCTG GCCTCTCATT GGTAACATGA
 241 TGATGATGGA CCAGTTAACT CACCGTGGCC TTGCCAAACT AGCCCAAAAA TATGGTGGTG
 301 TTTTTCACCT TAAAATGGGT TATGTTCACA AAATTGTAGT CTCTGGTCCA GACGAAGCTC
 361 GCCAAGTATT ACAGGAACAC GACATCATAT TTTCGAACCG TCCAGCGACC GTAGCCATAA
 421 GTTACCTAAC ATATGACAGG GCAGACATGG CTTTTGCTGA CTATGGACTC TTCTGGCGGC
 481 AGATGAGAAA ACTATGTGTA ATGAAACTCT TCAGCCGCAA ACGAGCTGAG TCATGGGACT
 541 CAGTTCGAGA CGAAGCGGAT TCCATGGTTA GAATTGTAAC AACCAACACA GGCACAGCTG
 601 TTAACTTAGG TGAACTTGTT TTCAGTCTCA CTCGTAATAT TATCTACAGA GCTGCTTTTG
 661 GAACTTGTTC TGAAGATGGA CAAGGCGAGT TCATTGAAAT TATGCAAGAG TTTTCGAAGC
 721 TATTTGGCGC TTTCAATATA GCTGATTTTA TTCCATGGCT AGGGTGGGTT GGTAAGCAGA
 781 GTCTAAATAT TAGACTTGCT AAGGCTAGAG CGTCGCTTGA TGGGTTCATT GATTCGATTA
 841 TTGATGACCA TATTATTAGA AAGAAAGCTT ATGTTAATGG CAAAAATGAT GGAGGTGATC
 901 GAGAAACTGA TATGGTGGAT GAGCTTTTAG CTTTTTACAG TGAGGAAGCA AAAGTAACTG
 961 AGTCCGAAGA TTTGCAGAAT GCTATCAGAC TTACTAAGGA TAGTATCAAA GCTATCATCA
1021 TGGATGTAAT GTTTGGAGGG ACAGAAACAG TGGCTTCTGC AATAGAATGG GCCATGGCAG
1081 AGCTTATGAG GAGTCCTGAA GATCTTAAAA AAGTACAACA AGGGCTGGCT AACGTTGTTG
1141 GACTCAACAG AAAAGTTGAA GAATCTGACT TTGAAAAATT AACATACTTA AGATGTTGTC
1201 TAAAAGAAAC TCTACGACTT CACCCTCCAA TCCCTCTCCT CCTCCATGAG ACCGCCGAGG
1261 AATCCACCGT CTCCGGCTAC CATATTCCGG CAAAGTCACA TGTTATTATA AATTCATTTG
1321 CCATTGGGCG TGACAAAAAT TCATGGGAAG ATCCTGAAAC TTATAAACCA TCTAGGTTTC
1381 TCAAAGAAGG TGTACCAGAT TTTAAAGGAG GTAATTTTGA GTTTATACCA TTTGGGTCGG
1441 GTCGGCGGTC TTGCCCCGGT ATGCAACTTG GGCTTTATGC ATTGGAAATG GCTGTGGCCC
1501 ATCTTCTTCA TTGTTTTACT TGGGAATTGC CAGATGGTAT GAAACCAAGT GAGCTTAAAA
1561 TGGATGATAT TTTTGGACTC ACTGCTCCAA GAGCTAATCG ACTCGTGGCT GTGCCTACTC
1621 CACGCTTGTT GTGTCCCCTT TATTAATTGA AGAAAAAAGG TGGGGCT
```

SEQ. ID. NO. 188

```
   1 MKEMVQNNMS TSLLETLQAT PMIFYFIVPL FCLFLLSKSR RKRLPPGPTG WPLIGNMMMM
  61 DQLTHRGLAK LAQKYGGVFH LKMGYVHKIV VSGPDEARQV LQEHDIIFSN RPATVAISYL
 121 TYDRADMAFA DYGLFWRQMR KLCVMKLFSR KRAESWDSVR DEADSMVRIV TTNTGTAVNL
 181 GELVFSLTRN IIYRAAFGTC SEDGQGEFIE IMQEFSKLFG AFNIADFIPW LGWVGKQSLN
 241 IRLAKARASL DGFIDSIIDD HIIRKKAYVN GKNDGGDRET DMVDELLAFY SEEAKVTESE
 301 DLQNAIRLTK DSIKAIIMDV MFGGTETVAS AIEWAMAELM RSPEDLKKVQ QGLANVVGLN
 361 RKVEESDFEK LTYLRCCLKE TLRLHPPIPL LLHETAEEST VSGYHIPAKS HVIINSFAIG
 421 RDKNSWEDPE TYKPSRFLKE GVPDFKGGNF EFIPFGSGRR SCPGMQLGLY ALEMAVAHLL
 481 HCFTWELPDG MKPSELKMDD IFGLTAPRAN RLVAVPTPRL LCPLY
```

FIG. 95

NAME D135-AE1
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 189

```
   1 GGGGGATAAG AATATGGAGA TACCATATTA CAGCTTAAAA CTTACAATTT TTTCATTTGC
  61 AATTATCTTT GTACTAAGAT GGGCATGGAA AATCTTGAAT TATGTGTGGT TAAAACCAAA
 121 AGAATTGGAG AAATGCATCA GACAGCAGGG TTTCAAAGGA AACTCTTACA AATTCTTGTT
 181 TGGGGATATG AAAGAGATAA AGAAAATGGG TGAAGAAGCT ATGTCTAAGC CAATCAATTT
 241 CTCTCATGAC ATGATTTGGC CTAGAGTCAT GCCCTTCATC CACAAAACCA TCACCAATTA
 301 TGGTAAGAAT TGTTTTGTGT GGTTTGGGCC AAGACCAGCA GTCCTGATCA CAGACCCGGA
 361 ACTTGTAAAG GAGGTGCTAA CGAAGAATTT CGTTTATCAG AAGCCACCTG GCACTCCACT
 421 CACAAAATTG GCAGCAACTG GAATTGCAGG CTATGAAACA GATAAATGGG CTACACATAG
 481 AAGGCTTCTC AATCCTGCTT TTCACCTTGA CAAGTTGAAG CATATGCTAC CTGCATTCCA
 541 ATTTACTGCT TGTGAGATGT TGAGCAAATT GGAGAAAGTT GTCTCACCAA ATGGAACAGA
 601 GATAGATGTG TGGCCATATC TACAAACTTT AACAAGTGAT GCCATTTCAA GAACTGCTTT
 661 TGGCAGTAGT TATGAAGAAG GAAGAAAGCT TTTTGAACTT CAAAAGGAAC AACTTTCACT
 721 AATTCTAGAA GTGTCCCGCA CAATATACAT CCCAGGATGG AGGTTTTTGC CAACAAAAAG
 781 GAACAAAAGG ATGAAGCAAA TATTTAATGA AGTACGAGCG CTGGTATTGG GAATTATTAA
 841 GAAAAGATTG AGTATGATTG AAAATGGAGA AGCTCCTGAT GATTTATTGG GTATATTATT
 901 GGCATCCAAT TTAAAAGAAA TCCAACAACA TGGAAATAAC AAGAAATTTG GTATGAGTAT
 961 TGATGAGGTG ATTGAAGAGT GTAAACTCTT CTATTTTGCG GGGCAAGAGA CAACTTCATC
1021 TTTACTTGTA TGGACTATGA TTTTGTTGTG CAAACATCCT AGTTGGCAAG ATAAAGCTAG
1081 AGAAGAGGTT TTGCAAGTGT TTGGAAGTAG GGAAGTTGAC TATGACAAGT TGAATCAGCT
1141 AAAAATAGTA ACTATGATCT TAAACGAGGT CTTAAGGTTG TATCCAGCAG GATATGCGAT
1201 TAATCGAATG GTAACCAAAG AAACAAAGTT AGGGAATTTA TGTTTACCAG CTGGGGTACA
1261 ACTCTTGTTA CCAACAATTT TGTTGCAACA TGATACTGAA ATATGGGGAG ATGATGCAAT
1321 GGAGTTCAAT CCAGAGAGAT TTAGTGATGG AATATCCAAA GCAACAAAAG GAAAACTTGT
1381 GTTCTTTCCA TTTAGTTGGG GTCCAAGAAT ATGTATTGGG CAAAATTTTG CTATGTTAGA
1441 GGCCAAGATG GCAATGGCTA TGATTCTGAA AAACTATGCA TTTGAACTCT CTCCATCTTA
1501 TGCTCATGCT CCTCATCCAC TACTACTTCA ACCTCAATAT GGTGCTCAAT TAATTTTGTA
1561 CAAGTTGTAG AAATGGTCAA TTTGGAACTT GTTATGGAAC TTTTATCATC GTAATCAACC
```

SEQ. ID. NO. 190

```
   1 MEIPYYSLKL TIFSFAIIFV LRWAWKILNY VWLKPKELEK CIRQQGFKGN SYKFLFGDMK
  61 EIKKMGEEAM SKPINFSHDM IWPRVMPFIH KTITNYGKNC FVWFGPRPAV LITDPELVKE
 121 VLTKNFVYQK PPGTPLTKLA ATGIAGYETD KWATHRRLLN PAFHLDKLKH MLPAFQFTAC
 181 EMLSKLEKVV SPNGTEIDVW PYLQTLTSDA ISRTAFGSSY EEGRKLFELQ KEQLSLILEV
 241 SRTIYIPGWR FLPTKRNKRM KQIFNEVRAL VLGIIKKRLS MIENGEAPDD LLGILLASNL
 301 KEIQQHGNNK KFGMSIDEVI EECKLFYFAG QETTSSLLVW TMILLCKHPS WQDKAREEVL
 361 QVFGSREVDY DKLNQLKIVT MILNEVLRLY PAGYAINRMV TKETKLGNLC LPAGVQLLLP
 421 TILLQHDTEI WGDDAMEFNP ERFSDGISKA TKGKLVFFPF SWGPRICIGQ NFAMLEAKMA
 481 MAMILKNYAF ELSPSYAHAP HPLLLQPQYG AQLILYKL
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FIG. 96

```
NAME            D141-AD7
ORGANISM        NICOTIANA TABACUM
SEQ. ID. NO. 191
   1 GTCCTAACTA AAAATGGAGA TTCAGTTTTC TAACTTAGTT GCATTCTTGC TCTTTCTCTC
  61 CAGCATCTTT CTTCTATTCA AAAAATGGAA AACCAGAAAA CTAAATTTGC CTCCTGGTCC
 121 ATGGAAATTA CCTTTTATTG GAAGTTTACA CCATTTGGCT GTGGCAGGTC CACTTCCTCA
 181 CCATGGCCTA AAAAATTTAG CCAAACGCTA TGGTCCTCTT ATGCATTTAC AACTTGGACA
 241 AATTCCTACA CTCATCATAT CATCACCTCA AATGGCAAAA GAAGTACTAA AAACTCACGA
 301 CCTCGCTTTT GCCACTAGAC CAAAGCTTGT CGTGGCCGAC ATCATTCACT ACGACAGCAC
 361 GGACATAGCA TTTTCTCCGT ACGGTGAATA CTGGAGACAA ATTCGTAAAA TTTGCATATT
 421 GGAACTCTTG AGTGCCAAGA TGGTCAAATT TTTTAGCTCG ATTCGCCAAG ATGAGCTCTC
 481 GAAGATGCTC TCATCTATAC GAACGACACC CAATCTTACA GTCAATCTTA CTGACAAAAT
 541 TTTTTGGTTT ACGAGTTCGG TAACTTGTAG ATCAGCTTTA GGGAAGATAT GTGGTGACCA
 601 AGACAAATTG ATCATTTTTA TGAGGGAAAT AATATCATTG GCAGGTGGAT TTAGTATTGC
 661 TGATTTTTTC CCTACATGGA AAATGATTCA TGATATTGAT GGTTCGAAAT CTAAACTGGT
 721 GAAAGCACAT CGTAAGATTG ATGAAATTTT GGGAAATGTT GTTGATGAGC ACAAAAAGAA
 781 CAGAGCAGAT GGCAAGAAGG GTAATGGTGA ATTTGGTGGT GAAGATTTGA TTGATGTATT
 841 GTTAAGAGTT AGAGAAAGTG GAGAAGTTCA AATTCCTATC ACAAATGACA ATATCAAATC
 901 AATATTAATC GACATGTTCT CTGCGGGATC TGAAACATCA TCGACGACTA TAATTTGGGC
 961 ATTAGCTGAA ATGATGAAGA AACCAAGTGT TTTAGCAAAG GCACAAGCTG AAGTAAGGCA
1021 AGCTTTGAAG GAGAAAAAAG GTTTTCAACA GATTGATCTT GATGAGCTAA AATATCTCAA
1081 GTTAGTAATC AAAGAAACCT TAAGAATGCA CCCTCCAATT CCTCTATTAG TTCCTAGAGA
1141 ATGTATGGAG GATACAAAGA TTGATGGTTA CAATATACCT TTCAAAACAA GAGTCATAGT
1201 TAATGCATGG GCAATCGGAC GAGATCCAGA AAGTTGGGAT GACCCCGAAA GCTTTATGCC
1261 AGAGAGATTT GAGAATAGTT CTATTGACTT TCTTGGAAAT CATCATCAGT TTATACCATT
1321 TGGTGCAGGA AGAAGGATTT GTCCGGGAAT GCTATTTGGT TTAGCTAATG TTGGACAACC
1381 TTTAGCTCAG TTACTTTATC ACTTCGATTG GAAACTCCCT AATGGACAAA GTCATGAGAA
1441 TTTCGACATG ACTGAGTCAC CTGGAATTTC TGCTACAAGA AAGGATGATC TTGTTTTGAT
1501 TGCCACTCCT TATGATTCTT ATTAAGCAGT AGCAGAAATA AAAAGCCGGG GCAAACAGAA
1561 AAAAGT

SEQ. ID. NO. 192
   1 MEIQFSNLVA FLLFLSSIFL LFKKWKTRKL NLPPGPWKLP FIGSLHHLAV AGPLPHHGLK
  61 NLAKRYGPLM HLQLGQIPTL IISSPQMAKE VLKTHDLAFA TRPKLVVADI IHYDSTDIAF
 121 SPYGEYWRQI RKICILELLS AKMVKFFSSI RQDELSKMLS SIRTTPNLTV NLTDKIFWFT
 181 SSVTCRSALG KICGDQDKLI IFMREIISLA GGFSIADFFP TWKMIHDIDG SKSKLVKAHR
 241 KIDEILGNVV DEHKKNRADG KKGNGEFGGE DLIDVLLRVR ESGEVQIPIT NDNIKSILID
 301 MFSAGSETSS TTIIWALAEM MKKPSVLAKA QAEVRQALKE KKGFQQIDLD ELKYLKLVIK
 361 ETLRMHPPIP LLVPRECMED TKIDGYNIPF KTRVIVNAWA IGRDPESWDD PESFMPERFE
 421 NSSIDFLGNH HQFIPFGAGR RICPGMLFGL ANVGQPLAQL LYHFDWKLPN GQSHENFDMT
 481 ESPGISATRK DDLVLIATPY DSY
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FIG. 97

NAME D147-AD3
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 193

```
   1 CAACTAACAA ACACATTGAG TCCTCTCCCA AATCACTGAT TCACCACCAA AAGTACCAAC
  61 AATTCAATGG AAGGTACAAA CTTGACTACA TATGCAGCAG TATTTCTTGA TACTCTGTTT
 121 CTTTTGTTCC TTTCCAAACT TCTTCGCCAG AGGAAACTCA ATTTACCTCC AGGCCCAAAA
 181 CCATGGCCGA TCATCGGAAA CTTAAACCTT ATTGGCAATC TTCCTCATCG CTCAATCCAC
 241 GAACTCTCCC TCAAGTACGG ACCCGTTATG CAACTCCAAT TCGGGTCTTT CCCCGTTGTA
 301 GTTGGATCCT CCGTCGAAAT GGCTAAGATT TTCCTCAAAT CCATGGATAT TAACTTTGTA
 361 GGCAGGCCTA AAACGGCTGC CGGAAAATAC ACAACGTACA ATTATTCCGA TATTACATGG
 421 TCTCCTTACG GACCATATTG GCGCCAGGCA CGTAGGATGT GCCTAACGGA ATTATTCAGC
 481 ACGAAACGTC TCGATTCATA CGAGTATATT CGGGCTGAGG AGTTGCATTC TCTTCTCCAT
 541 AATTTGAACA AAATATCAGG GAAACCAATT GTGTTGAAAG ATTATTCGAC GACGTTGAGT
 601 TTAAATGTTA TTAGCAGGAT GGTACTGGGG AAAAGGTATT TGGACGAATC CGAGAACTCG
 661 TTCGTGAATC CTGAGGAATT TAAGAAGATG TTGGACGAAT TGTTTTTGCT AAATGGTGTA
 721 CTTAATATTG GAGATTCAAT TCCATGGATT GATTTCATGG ATTTGCAAGG TTATGTTAAG
 781 AGGATGAAAG TAGTGAGCAA GAAATTCGAC AAGTTTTTAG AGCATGTTAT TGATGAGCAT
 841 AACATTAGGA GAAATGGAGT GGAGAATTAT GTTGCTAAGG ATATGGTGGA TGTTTTGTTG
 901 CAGCTCGCTG ATGATCCGAA GTTGGAAGTT AAGCTGGAGA GACATGGAGT CAAAGCATTC
 961 ACTCAGGATA TGCTGGCTGG TGGAACCGAG AGTTCAGCAG TGACAGTGGA GTGGGCAATT
1021 TCAGAGCTGC TAAAGAAGCC GGAGATTTTC AAAAAGGCTA CAGAAGAATT GGATCGAGTA
1081 ATTGGGCAGA ATAGATGGGT ACAAGAAAAG GACATTCCAA ATCTTCCTTA CATAGAGGCA
1141 ATAGTCAAAG AGACTATGCG ACTGCACCCC GTGGCACCAA TGTTGGTGCC ACGTGAGTGT
1201 CGAGAAGATA TTAAGGTAGC AGGCTACGAC GTTCAGAAAG GAACTAGGGT TCTCGTGAGT
1261 GTATGGACTA TTGGAAGAGA CCCTACATTG TGGGACGAGC CTGAGGTGTT CAAGCCGGAG
1321 AGATTCCATG AAAGGTCCAT AGATGTTAAA GGACATGATT ATGAGCTTTT GCCATTTGGA
1381 GCGGGGAGAA GAATGTGCCC GGGTTATAGC TTGGGGCTCA AGGTGATTCA AGCTAGCTTA
1441 GCTAATCTTC TACATGGATT TAACTGGTCA TTGCCTGATA ATATGACTCC TGAGGACCTC
1501 AACATGGATG AGATTTTTGG GCTCTCTACA CCTAAAAAAT TTCCACTTGC TACTGTGATT
1561 GAGCCAAGAC TTTCACCAAA ACTTTACTCT GTTTGATTCA GCAGTTCTAT GGTTCCGTCA
1621 AGATAGACTT TGTTACGTTT GAACCTGTGC TC
```

SEQ. ID. NO. 194

```
  1 MEGTNLTTYA AVFLDTLFLL FLSKLLRQRK LNLPPGPKPW PIIGNLNLIG NLPHRSIHEL
 61 SLKYGPVMQL QFGSFPVVVG SSVEMAKIFL KSMDINFVGR PKTAAGKYTT YNYSDITWSP
121 YGPYWRQARR MCLTELFSTK RLDSYEYIRA EELHSLLHNL NKISGKPIVL KDYSTTLSLN
181 VISRMVLGKR YLDESENSFV NPEEFKKMLD ELFLLNGVLN IGDSIPWIDF MDLQGYVKRM
241 KVVSKKFDKF LEHVIDEHNI RRNGVENYVA KDMVDVLLQL ADDPKLEVKL ERHGVKAFTQ
301 DMLAGGTESS AVTVEWAISE LLKKPEIFKK ATEELDRVIG QNRWVQEKDI PNLPYIEAIV
361 KETMRLHPVA PMLVPRECRE DIKVAGYDVQ KGTRVLVSVW TIGRDPTLWD EPEVFKPERF
421 HERSIDVKGH DYELLPFGAG RRMCPGYSLG LKVIQASLAN LLHGFNWSLP DNMTPEDLNM
481 DEIFGLSTPK KFPLATVIEP RLSPKLYSV
```

FIG. 98

NAME D163-AF12
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 195

```
   1 CTTCTTCCTT CCTAACTAAA AATGGAGATT CAGTTTTCTA ACTTAGTTGC ATTCTTGCTC
  61 TTTCTCTCCA GCATCTTTCT TGTATTCAAA AAATGGAAAA CCAGAAAACT AAATTTGCCT
 121 CCTGGTCCAT GGAAATTACC TTTTATTGGA AGTTTACACC ATTTGGCTGT GGCAGGTCCA
 181 CTTCCTCACC ATGGCCTAAA AAATTTAGCC AAACGCTATG GTCCTCTTAT GCATTTACAA
 241 CTTGGACAAA TTCCTACACT CGTCATATCA TCACCTCAAA TGGCAAAAGA AGTACTAAAA
 301 ACTCACGACC TCGCTTTTGC CACTAGACCA AAGCTTGTCG TGGCCGACAT CATTCACTAC
 361 GACAGCACGG ACATAGCATT TTCGCCATAC GGTGAATACT GGAGACAAAT TCGTAAAATT
 421 TGCATATTGG AACTCTTGAG TGCCAAGATG GTCAAGTTTT TTAGCTCGAT TCGCCAAGAT
 481 GAGCTCTCGA AGATGGTTTC ATCTATACGA ACGACGCCCA ATCTTCCAGT CAATCTTACC
 541 GACAAGATTT TTTGGTTTAC GAGTTCGGTA ATTTGTAGAT CAGCTTTAGG GAAGATATGT
 601 GGTGACCAAG ACAAATTGAT CATTTTTATG AGGGAAATAA TATCATTGGC AGGTGGATTT
 661 AGTATTGCTG ATTTTTTCCC TACATGGAAA ATGATTCATG ATATTGATGG TTCAAAATCT
 721 AAACTGGTGA AGGCACATCG TAAGATTGAT GAAATTTTGG AAAATGTGGT AAATGAGCAC
 781 AAACAGAATC GAGCAGATGG TAAAAAGGGT AATGGTGAAT TTGGTGGAGA AGATCTGATT
 841 GATGTTTTGT TAAGAGTTAG AGAAAGTGGA GAAGTTCAAA TTCCAATCAC AGATGACAAT
 901 ATCAAATCAA TATTAATCGA CATGTTCTCT GCCGGATCGG AAACATCATC GACAACTATA
 961 ATTTGGGCAT TAGCTGAAAT GATGAAGAAA CCAAGTGTTT TAGCAAAGGC ACAAGCTGAA
1021 GTGAGGCAAG CTTTGAAGGG GAAGAAAATT AGTTTTCAAG AGATTGATAT TGATAAGCTA
1081 AAGTATTTGA AGTTAGTGAT CAAAGAAACT TTAAGAATGC ACCCTCCAAT TCCTCTGTTA
1141 GTCCCTAGAG AATGTATGGA AGATACAAAG ATTGATGGTT ACAATATACC TTTCAAAACA
1201 AGAGTCATTG TTAATGCATG GGCAATTGGA CGAGATCCTC AAAGTTGGGA TGATCCTGAA
1261 AGCTTTACGC CAGAGAGATT TGAGAATAAT TCTATTGATT TTCTTGGAAA TCATCATCAA
1321 TTTATTCCAT TTGGTGCAGG AAGAAGGATT TGTCCTGGAA TGCTATTTGG TTTAGCTAAT
1381 GTTGGACAAC CTTTAGCTCA GTTACTTTAT CACTTCGATT GGAAACTCCC TAATGGACAA
1441 AGTCATGAGA ATTTCGACAT GACTGAGTCA CCTGGAATTT CTGCTACAAG AAAGGATGAT
1501 CTTGTTTTGA TTGCCACTCC TTATGATTCT TATTAAGCAG TAGCAGAAAT AAAAAGCCGG
1561 GGCAAACAGA AAAAAGTATT GCTGCTTCTA GGTATTTTCT ATTGGATAAA TTTCAAAATT
1621 CATCCACAAT ATTTAGTGTT TGCTAGAGTT GGTTAGC
```

SEQ. ID. NO. 196

```
   1 MEIQFSNLVA FLLFLSSIFL VFKKWKTRKL NLPPGPWKLP FIGSLHHLAV AGPLPHHGLK
  61 NLAKRYGPLM HLQLGQIPTL VISSPQMAKE VLKTHDLAFA TRPKLVVADI IHYDSTDIAF
 121 SPYGEYWRQI RKICILELLS AKMVKFFSSI RQDELSKMVS SIRTTPNLPV NLTDKIFWFT
 181 SSVICRSALG KICGDQDKLI IFMREIISLA GGFSIADFFP TWKMIHDIDG SKSKLVKAHR
 241 KIDEILENVV NEHKQNRADG KKGNGEFGGE DLIDVLLRVR ESGEVQIPIT DDNIKSILID
 301 MFSAGSETSS TTIIWALAEM MKKPSVLAKA QAEVRQALKG KKISFQEIDI DKLKYLKLVI
 361 KETLRMHPPI PLLVPRECME DTKIDGYNIP FKTRVIVNAW AIGRDPQSWD DPESFTPERF
 421 ENNSIDFLGN HHQFIPFGAG RRICPGMLFG LANVGQPLAQ LLYHFDWKLP NGQSHENFDM
 481 TESPGISATR KDDLVLIATP YDSY
```

FIG. 99

```
NAME         D163-AG11
ORGANISM     NICOTIANA TABACUM
SEQ. ID. NO. 197
      1 CTTCTTCCTT CCTAACTAAA AATGGAGATT CAGTTTTCTA ACTTAGTTGC ATTCTTGCTC
     61 TTTCTCTCCA GCATCTTTCT TGTATTCAAA AAATGGAAAA CCAGAAAACT AAATTTGCCT
    121 CCTGGTCCAT GGAAATTACC TTTTATTGGA AGTTTACACC ATTTGGCTGT GGCAGGTCCA
    181 CTTCCTCACC ATGGCCTAAA AAATTTAGCC AAACGCTATG GTCCTCTTAT GCATTTACAA
    241 CTTGGACAAA TTCCTACACT CGTCATATCA TCACCTCAAA TGGCAAAAGA AGTACTAAAA
    301 ACTCACGACC TCGCTTTTGC CACTAGACCA AAGCTTGTCG TGGCCGACAT CATTCACTAC
    361 GACAGCACGG ACATAGCACT TTCGCCATAC GGTGAATACT GGAGACAAAT TCGTAAAATT
    421 TGCATATTGG AACTCTTGAG TGCCAAGATG GTCAAGTTTT TTAGCTCGAT TCGCCAAGAT
    481 GAGCTCTCGA AGATGGTTTC ATCTATACGA ACGACGCCCA ATCTTCCAGT CAATCTTACC
    541 GACAAGATTT TTTGGTTTAC GAGTTCGGTA ATTTGTAGAT CAGCTTTAGG GAAGATATGT
    601 GGTGACCAAG ACAAATTGAT CATTTTTATG AGGGAAATAA TATCATTGGC AGGTGGATTT
    661 AGTATTGCTG ATTTTTTCCC TACATGGAAA ATGATTCATG ATATTGATGG TTCAAAATCT
    721 AAACTGGTGA AGGCACATCG TAAGATTGAT GAAATTTTGG AAAATGTGGT AAATGAGCAC
    781 AAACAGAATC GAGCAGATGG TAAAAAGGGT AATGGTGAAT TTGGTGGAGA AGATCTGATT
    841 GATGTTTTGT TAAGAGTTAG AGAAAGTGGA GAAGTTCAAA TTCCAATCAC AGATGACAAT
    901 ATCAAATCAA TATTAATCGA CATGTTCTCT GCCGGATCGG AAACATCATC GACAACTATA
    961 ATTTGGGCAT TAGCTGAAAT GATGAAGAAA CCAAGTGTTT TAGCAAAGGC ACAAGCTGAA
   1021 GTGAGCCAAG CTTTGAAGGG GAAGAAAATT AGTTTTCAAG AGATTGATAT TGATAAGCTA
   1081 AAGTATTTGA AGTTAGTGAT CAAAGAAACT TTAAGAATGC ACCCTCCAAT TCCTCTGTTA
   1141 GTCCCTAGAG AATGTATGGA AGATACAAAG ATTGATGGTT ACAATATACC TTTCAAAACA
   1201 AGAGTCATTG TTAATGCATG GGCAATTGGA CGAGATCCTC AAAGTTGGGA TGATCCTGAA
   1261 AGCTTTACGC CAGAGAGATT TGAGAATAAT TCTATTGATT TTCTTGGAAA TCATCATCAA
   1321 TTTATTCCAT TTGGTGCAGG AAGAAGGATT TGTCCTGGAA TGCTATTTGG TTTAGCTAAT
   1381 GTTGGACAAC CTTTAGCTCA GTTACTTTAT CACTTCGATT GGAAACTCCC TAATGGACAA
   1441 ACTCACCAAA ATTTCGACAT GACTGAGTCA CCTGGAATTT CTGCTACAAG AAAGGATGAT
   1501 CTTATTTTGA TTGCCACTCC TGCTCATTCT TGATTAAGTA TTGCTGCTTT TCTATTGGAG
   1561 AATTTTCAAA ATTCATCCAC AATATATAGT GTTTGCTAGA GTTGGTTAGC

SEQ. ID. NO. 198
      1 MEIQFSNLVA FLLFLSSIFL VFKKWKTRKL NLPPGPWKLP FIGSLHHLAV AGPLPHHGLK
     61 NLAKRYGPLM HLQLGQIPTL VISSPQMAKE VLKTHDLAFA TRPKLVVADI IHYDSTDIAL
    121 SPYGEYWRQI RKICILELLS AKMVKFFSSI RQDELSKMVS SIRTTPNLPV NLTDKIFWFT
    181 SSVICRSALG KICGDQDKLI IFMREIISLA GGFSIADFFP TWKMIHDIDG SKSKLVKAHR
    241 KIDEILENVV NEHKQNRADG KKGNGEFGGE DLIDVLLRVR ESGEVQIPIT DDNIKSILID
    301 MFSAGSETSS TTIIWALAEM MKKPSVLAKA QAEVSQALKG KKISFQEIDI DKLKYLKLVI
    361 KETLRMHPPI PLLVPRECME DTKIDGYNIP FKTRVIVNAW AIGRDPQSWD DPESFTPERF
    421 ENNSIDFLGN HHQFIPFGAG RRICPGMLFG LANVGQPLAQ LLYHFDWKLP NGQTHQNFDM
    481 TESPGISATR KDDLILIATP AHS
```

FIG. 100

NAME D163-AG12
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 199

```
   1 ATCCTTCTTC CTTCCTAGGT CCTAACTAAA AATGGAGATT CAGTTTTCTA ACTTAGTTGC
  61 ATTCTTGCTC TTTCTCTCCA GCATCTTTCT TCTATTCAAA AAATGGAAAA CCAGAAAACT
 121 AAATTTGCCT CCTGGTCCAT GGAAATTACC TTTTATTGGA AGTTTACACC ATTTGGCTGT
 181 GGCAGGTCCA CTTCCTCACC ATGGCCTAAA AAATTTAGCC AAACGCTATG GTCCTCTTAT
 241 GCATTTACAA CTTGGACAAA TTCCTACACT CATCATATCA TCACCTCAAA TGGCAAAAGA
 301 AGTACTAAAA ACTCACGACC TCGCTTTTGC CACTAGACCA AAGCTTGTCG TGGCCGACAT
 361 CATTCACTAC GACAGCACGG ACATAGCATT TTCTCCGTAC GGTGAATACT GGAGACAAAT
 421 TCGTAAAATT TGCATATTGG AACTCTTGAG TGCCAAGATG GTCAAATTTT TTAGCTCGAT
 481 TCGCCAAGAT GAGCTCTCGA AGATGCTCTC ATCTATACGA ACGACACCCA ATCTTACAGT
 541 CAATCTTACT GACAAAATTT TTTGGTTTAC GAGTTCGGTA ACTTGTAGAT CAGCTTTAGG
 601 GAAGATATGT GGTGACCAAG ACAAATTGAT CATTTTTATG AGGGAAATAA TATCATTGGC
 661 AGGTGGATTT AGTATTGCTG ATTTTTTCCC TACATGGAAA ATGATTCATG ATATTGATGG
 721 TTCGAAATCT AAACTGGTGA AAGCACATCG TAAGATTGAT GAAATTTTGG GAAATGTTGT
 781 TGATGAGCAC AAAAAGAACA GAGCAGATGG CAAGAAGGGT AATGGTGAAT TTGGTGGTGA
 841 AGATTTGATT GATGTATTGT TAAGAGTTAG AGAAAGTGGA GAAGTTCAAA TTCCTATCAC
 901 AAATGACAAT ATCAAATCAA TATTAATCGA CATGTTCTCT GCGGGATCTG AAACATCATC
 961 GACGACTATA ATTTGGGCAT TAGCTGAAAT GATGAAGAAA CCAAGTGTTT TAGCAAAGGC
1021 ACAAGCTGAA GTAAGGCAAG CTTTGAAGGA GAAAAAAGGT TTTCAACAGA TTGATCTTGA
1081 TGAGCTAAAA TATCTCAAGT TAGTAATCAA AGAAACCTTA AGAATGCACC CTCCAATTCC
1141 TCTATTAGTT CCTAGAGAAT GTATGGAGGA TACAAAGATT GATGGTTACA ATATACCTTT
1201 CAAAACAAGA GTCATAGTTA ATGCATGGGC AATCGGACGA GATCCAGAAA GTTGGGATGA
1261 CCCCGAAAGC TTTATGCCAG AGAGATTTGA GAATAGTTCT ATTGACTTTC TTGGAAATCA
1321 TCATCAGTTT ATACCATTTG GTGCAGGAAG AAGGATTTGT CCGGGAATGC TATTTGGTTT
1381 AGCTAATGTT GGACAACCTT TAGCTCAGTT ACTTTATCAC TTCGATTGGA AACTCCCTAA
1441 TGGACAAAGT CATGAGAATT TCGACATGAC TGAGTCACCT GGAATTTCTG CTACAAGAAA
1501 GGATGATCTT GTTTTGATTG CCACTCCTTA TGATTCTTAT TAAGCAGTAG CAGAAATAAA
1561 AAGCCGGGGC AAACAGAAAA AAGTATTGCT GCTTCTAGGT ATTTTCTATT GGATAAATTT
1621 CAAAATTCAT CCACAATATT TAGTGTTTGC TAGAGTTGGT TAGC
```

SEQ. ID. NO. 200

```
   1 MEIQFSNLVA FLLFLSSIFL LFKKWKTRKL NLPPGPWKLP FIGSLHHLAV AGPLPHHGLK
  61 NLAKRYGPLM HLQLGQIPTL IISSPQMAKE VLKTHDLAFA TRPKLVVADI IHYDSTDIAF
 121 SPYGEYWRQI RKICILELLS AKMVKFFSSI RQDELSKMLS SIRTTPNLTV NLTDKIFWFT
 181 SSVTCRSALG KICGDQDKLI IFMREIISLA GGFSIADFFP TWKMIHDIDG SKSKLVKAHR
 241 KIDEILGNVV DEHKKNRADG KKGNGEFGGE DLIDVLLRVR ESGEVQIPIT NDNIKSILID
 301 MFSAGSETSS TTIIWALAEM MKKPSVLAKA QAEVRQALKE KKGFQQIDLD ELKYLKLVIK
 361 ETLRMHPPIP LLVPRECMED TKIDGYNIPF KTRVIVNAWA IGRDPESWDD PESFMPERFE
 421 NSSIDFLGNH HQFIPFGAGR RICPGMLFGL ANVGQPLAQL LYHFDWKLPN GQSHENFDMT
 481 ESPGISATRK DDLVLIATPY DSY
```

FIG. 101

NAME D205-BG9
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 201

```
   1 TTCTTATTTT GATTCAACCA TGGAGAACCA ATACTCCTAC TCATTCTCTT CCTACTTCTA
  61 CTTAGCTATA GTACTGTTTC TTCTTCCAAT TTTGGTCAAA TATTTCTTCC ATCGGAGAAG
 121 AAATTTACCT CCAAGTCCAT TTTCTCTTCC AATAATTGGT CACCTTTACC TTCTCAAGAA
 181 AACTCTCCAT CTCACTCTAA CATCCTTATC AGCTAAATAT GGTCCTGTTT TATACCTCAA
 241 ATTGGGCTCT ATGCCTGTGA TTGTTGTGTC CTCACCATCT GCTGTTGAAG AATGTTTAAC
 301 CAAGAATGAT ATCATATTCG CAAATAGGCC CAAGACCGTG GCTGGTGACA AGTTTACCTA
 361 CAATTATACT GTTTATGTTT GGGCACCCTA TGGCCAACTT TGGAGAATTC TTCGCCGATT
 421 AACTGTCGTT GAACTCTTCT CTTCACATAG CCTACAGAAA ACTTCTATCC TTAGAGATCA
 481 AGAAGTTGCA ATATTTATCC GTTCGTTATA CAAATTCTCA AAGGATAGTA GCAAAAAAGT
 541 CGATTTGACC AACTGGTCTT TTACTTTGGT TTTCAATCTT ATGACCAAAA TTATTGCTGG
 601 GAGACATATT GTGAAGGAGG AAGATGCTGG CAAGGAAAAG GGCATTGAAA TTATTGAAAA
 661 ACTTAGAGGG ACTTTCTTAG TAACTACATC ATTCTTGAAT ATGTGTGATT TCTTGCCAGT
 721 ATTCAGGTGG GTTGGTTACA AAGGGCTGGA GAAGAAGATG GCCTCAATTC ACAATAGAAG
 781 AAATGAATTC TTGAACAGCT TGCTTGATGA ATTTCGACAC AAGAAAAGTA GTGCTTCACA
 841 ATCTAACACA ACTGTTGGAA ACATGGAGAA GAAAACCACA CTGATTGAAA AGCTCTTGTC
 901 TCTTCAAGAA TCAGAGCCTG AATTCTACAC TGATGATATC ATCAAAAGTA TTATGCTGGT
 961 AGTTTTTGTT GCAGGAACAG AGACCTCATC AACAACCATC CAATGGGTAA TGAGGCTTCT
1021 TGTAGCTCAC CCTGAGGCAT TGTATAAGCT ACGAGCTGAC ATTGACAGTA AAGTTGGGAA
1081 TAAGCGCTTG CTGAATGAAT CAGACCTCAA CAAGCTTCCG TATTTGCATT GTGTTGTTAA
1141 TGAGACAATG AGATTATACA CTCCGATACC ACTTTTATTG CCTCATTATT CAACTAAAGA
1201 TTGTATTGTG GAAGGATATG ATGTACCAAA ACATACAATG TTGTTTGTCA ACGCTTGGGC
1261 CATTCACAGG GATCCCAAGG TATGGGAGGA GCCTGACAAG TTCAAGCCAG AGAGATTTGA
1321 GGCAACAGAA GGGGAAACAG AAAGGTTCAA TTACAAGCTT GTACCATTTG GAATGGGGAG
1381 AAGAGCGTGC CCTGGAGCTG ATATGGGGTT GCGAGCAGTT TCTTTGGCAT TAGGTGCACT
1441 TATTCAATGC TTTGACTGGC AAATTGAGGA AGCGGAAAGC TTGGAGGAAA GCTATAATTC
1501 TAGAATGACT ATGCAGAACA AGCCTTTGAA GGTTGTCTGC ACTCCACGCG AAGATCTTGG
1561 CCAGCTTCTA TCCCAACTCT AAGGCAATTT ATCAATGCCA AACGTAATCT TCATCTACCA
1621 CTATG
```

SEQ. ID. NO. 202

```
   1 MENQYSYSFS SYFYLAIVLF LLPILVKYFF HRRRNLPPSP FSLPIIGHLY LLKKTLHLTL
  61 TSLSAKYGPV LYLKLGSMPV IVVSSPSAVE ECLTKNDIIF ANRPKTVAGD KFTYNYTVYV
 121 WAPYGQLWRI LRRLTVVELF SSHSLQKTSI LRDQEVAIFI RSLYKFSKDS SKKVDLTNWS
 181 FTLVFNLMTK IIAGRHIVKE EDAGKEKGIE IIEKLRGTFL VTTSFLNMCD FLPVFRWVGY
 241 KGLEKKMASI HNRRNEFLNS LLDEFRHKKS SASQSNTTVG NMEKKTTLIE KLLSLQESEP
 301 EFYTDDIIKS IMLVVFVAGT ETSSTTIQWV MRLLVAHPEA LYKLRADIDS KVGNKRLLNE
 361 SDLNKLPYLH CVVNETMRLY TPIPLLLPHY STKDCIVEGY DVPKHTMLFV NAWAIHRDPK
 421 VWEEPDKFKP ERFEATEGET ERFNYKLVPF GMGRRACPGA DMGLRAVSLA LGALIQCFDW
 481 QIEEAESLEE SYNSRMTMQN KPLKVVCTPR EDLGQLLSQL
```

FIG. 102

NAME D207-AA5
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 203

```
   1 AACCAACCTT CCTTTTCTTA CTTAGTAAAA TGGATATTCA GTCTTCTCCT TTCAACTTAA
  61 TTGCTTTGCT ACTCTTCATT TCATTTCTTT TTATCCTATT GAAAAAGTGG AATACCAAAA
 121 TCCCAAAGTT ACCTCCAGGT CCATGGAGAC TTCCCCTTAT TGGCAGCCTC CATCACTTGA
 181 AAGGTAAACT CCCACACCAT CATCTTAGAG ATTTAGCCCG AAAATATGGA CCTCTCATGT
 241 ATTTACAACT TGGAGAAGTT CCTGTAGTTG TAATATCTTC GCCACGTATA GCAAAAGCTG
 301 TACTAAAAAC TCATGATCTT GCTTTTGCAA CGAGGCCTCG GTTCATGTCC TCGGACATTG
 361 TGTTTTACAA AAGCAGGGAC ATATCATTCG CCCCATATGG CGATTACTGG AGACAAATGC
 421 GTAAAATATT AACACAAGAA CTCTTGAGTA ACAAGATGCT CAAGTCATTT AGCACAATCC
 481 GAAAGGATGA GCTCTCGAAG CTCCTCTCGT CGATTCGTTT AGCAACAGCT TCTTCTGCAG
 541 TGAACATAAA CGAAAAGCTT CTCTGGTTTA CAAGTTGCAT GACTTGTAGA TTAGCCTTTG
 601 GAAAAATATG CAACGATCGT GATGAATTGA TTATGTTAAT AAGGGAGATA TTAGCATTAT
 661 CAGGAGGATT TGATGTGTGT GATTTGTTCC CTTCATGGAA ATTACTTCAC AATATGAGCA
 721 ACATGAAAGC TAGATTGACG AATGTTCACC ATAAGTATAA TCTAATTATG GAGAATATCA
 781 TCAATGAGCA CAAAGAGAAT CATGCAGCAG GGATAAAGGG AAATAACGAG TTTGGTGGCG
 841 AAGATATGAT TGATGCTTTA CTGAGGGTTA AGGAGAATAA TGAGCTTCAA TTTCCTATCG
 901 AAAATGACAA CATGAAAGCA GTAATTCTGG ACTTGTTTAT TGCTGGAACT GAAACTTCAT
 961 ATACTGCAAT TATATGGGCA CTATCAGAAT TGATGAAGCA CCCAAGTGTT ATGGCCAAGG
1021 CACAAGCTGA AGTGAGAAAA GTCTTCAAAG AAAATGAAAA CTTGGACGAA AATGATCTTG
1081 ACAAGTTGCC ATACTTAAAA TCAGTGATCA AAGAAACACT AAGGATGCAT CCTCCAGTTC
1141 CTTTATTAGG ACCTAGAGAA TGCAGAGAAC AAACTGAGAT TGATGGATAT ACTGTACCTC
1201 TTAAAGCTAG AGTAATGGTT AATGCATGGG CAATTGGAAG AGATCCTGAA AGTTGGGAAG
1261 ATCCTGAAAG TTTCAAACCC GAGCGATTTG AAAATATTTC TGTTGATCTT ACGGGAAATC
1321 ACTATCAGTT CATCCCTTTC GGTTCAGGAA GAAGAATGTG TCCAGGAATG TCGTTTGGTT
1381 TAGTTAACAC TGGGCATCCT TTAGCTCAGT TGCTCTATTT CTTTGACTGG AAATTCCCTC
1441 ATAAGGTTAA TGCAGCTGAT TTTCACACTA CTGAAACAAG TAGAGTTTTT GCAGCAAGCA
1501 AAGATGACCT CTACTTGATT CCAACAAATC ACATGGAGCA AGAGTAGCTC TAAATTGAAT
1561 TCTTGTCTTG GAACAATAAA AGAAGAAACT CCAGCTTGGT CTACATTATT TCTTTTTGCT
1621 TTATATTAGT ATGGGTGTGT TCAGTTTCTT ATTTTTAAGG GTACCCTGAA AGATAAAGGG
1681 CTATATAAAC CAGTGAGACT TTTTATTGGT TGCAAGGTTT TAGATCAAGC CATAAGACAG
1741 CATATTTTAT TCAAAAAAAA AAAAAAA
```

SEQ. ID. NO. 204

```
   1 MDIQSSPFNL IALLLFISFL FILLKKWNTK IPKLPPGPWR LPLIGSLHHL KGKLPHHHLR
  61 DLARKYGPLM YLQLGEVPVV VISSPRIAKA VLKTHDLAFA TRPRFMSSDI VFYKSRDISF
 121 APYGDYWRQM RKILTQELLS NKMLKSFSTI RKDELSKLLS SIRLATASSA VNINEKLLWF
 181 TSCMTCRLAF GKICNDRDEL IMLIREILAL SGGFDVCDLF PSWKLLHNMS NMKARLTNVH
 241 HKYNLIMENI INEHKENHAA GIKGNNEFGG EDMIDALLRV KENNELQFPI ENDNMKAVIL
 301 DLFIAGTETS YTAIIWALSE LMKHPSVMAK AQAEVRKVFK ENENLDENDL DKLPYLKSVI
 361 KETLRMHPPV PLLGPRECRE QTEIDGYTVP LKARVMVNAW AIGRDPESWE DPESFKPERF
 421 ENISVDLTGN HYQFIPFGSG RRMCPGMSFG LVNTGHPLAQ LLYFFDWKFP HKVNAADFHT
 481 TETSRVFAAS KDDLYLIPTN HMEQE
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FIG. 103

NAME D207-AB4
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 205

```
   1 AACCAACCTT CCTTTTCTTA CTTAGTAAAA TGGATATTCA GTCTTCTCCT TTCAACTTAA
  61 TTGCTTTGCT ACTCTTCATT TCATTTCTTT TTATCCTATT GAAAAAGTGG AATACCAAAA
 121 TCCCAAAGTT ACCTCCAGGT CCATGGAGAC TTCCCCTTAT TGGCAGCCTC CATCACTTGA
 181 AAGGTAAACT CCCACACCAT CATCTTAGAG ATTTAGCCCG AAAATATGGA CCTCTCATGT
 241 ATTTACAACT TGGAGAAGTT CCTGTAGTTG TAATATCTTC GCCACGTATA GCAAAAGCTG
 301 TACTAAAAAC TCATGATCTT GCTTTTGCAA CGAGGCCTCG GTTCATGTCC TCGGACATTG
 361 TGTTTTACAA AAGCAGGGAC ATATCATTCG CCCCATATGG CGATTACTGG AGACAAATGC
 421 GTAAAATATT AACACAAGAA CTCTTGAGTA ACAAGATGCT CAAGTCATTT AGCACAATCC
 481 GAAAGGATGG GCTCTCGAAG CTCCTCTCGT CGATTCGTTT AGCAACAGCT TCTTCTGCAG
 541 TGAACATAAA CGAAAAGCTT CTCTGGTTTA CAAGTTGCAT GACTTGTAGA TTAGCCTTTG
 601 GAAAAATATG CAACGATCGT GATGAATTGA TTATGTTAAT AAGGGAGATA TTAGCATTAT
 661 CAGGAGGATT TGATGTGTGT GATTTGTTCC CTTCATGGAA ATTACTTCAC AATATGAGCA
 721 ACATGAAAGC TAGATTGACG AATGTTCACC ATAAGTATAA TCTAATTATG GAGAATATCA
 781 TCAATGAGCA CAAAGAGAAT CATGCAGCAG GGATAAAGGG AAATAACGAG TTTGGTGGCG
 841 AAGATATGAT TGATGCTTTA CTGAGGGTTA AGGAGAATAA TGAGCTTCAA TTTCCTATCG
 901 AAAATGACAA CATGAAAGCA GTAATTCTGG ACTTGTTTAT TGCTGGAACT GAAACTTCAT
 961 ATACTGCAAT TATATGGGCA CTATCAGAAT TGATGAAGCA CCCAAGTGTT ATGGCCAAGG
1021 CACAAGCTGA AGTGAGAAAA GTCTTCAAAG AAAATGAAAA CTTGGACGAA AATGATCTTG
1081 ACAAGTTGCC ATACTTAAAA TCAGTGATCA AAGAAACACT AAGGATGCAT CCTCCAGTTC
1141 CTTTATTAGG ACCTAGAGAA TGCAGAGAAC AAACTGAGAT TGATGGATAT ACTGTACCTC
1201 TTAAAGCTAG AGTAATGGTT AATGCATGGG CAATTGGAAG AGATCCTGAA AGTTGGGAAG
1261 ATCCTGAAAG TTTCAAACCC GAGCGATTTG AAAATATTTC TGTTGATCTT ACGGGAAATC
1321 ACTATCAGTT CATTCCTTTC GGTTCAGGAA GAAGAATGTG TCCAGGAATG TCGTTTGGTT
1381 TAGTTAACAC TGGGCATCCT TTAGCTCAGT TGCTCTATTT CTTTGACTGG AAATTCCCTC
1441 ATAAGGTTAA TGCAGCTGAT TTTCACACTA CTGAAACAAG TAGAGTTTTT GCAGCAAGCA
1501 AAGATGACCT CTACTTGATT CCAACAAATC ACATGGAGCA AGAGTAGCTC TAAATTGAAT
1561 TCTTGTCTTG GAACGATAAA AGAAGAAACT CCAGCTTGGT CTACATTATT TCTTTTTGCT
1621 TTATATTAGT ATGGGTGTGT TCAGTTTCTT GTTTTTAAGG GTACCCTGAA AGATAAAGGG
1681 CTATATAAAC CAGTGAGACT TTTTATTGAA AAAAAAAAAA AAAAAAAAAA AAAAAA
```

SEQ. ID. NO. 206

```
   1 MDIQSSPFNL IALLLFISFL FILLKKWNTK IPKLPPGPWR LPLIGSLHHL KGKLPHHHLR
  61 DLARKYGPLM YLQLGEVPVV VISSPRIAKA VLKTHDLAFA TRPRFMSSDI VFYKSRDISF
 121 APYGDYWRQM RKILTQELLS NKMLKSFSTI RKDELSKLLS SIRLATASSA VNINEKLLWF
 181 TSCMTCRLAF GKICNDRDEL IMLIREILAL SGGFDVCDLF PSWKLLHNMS NMKARLTNVH
 241 HKYNLIMENI INEHKENHAA GIKGNNEFGG EDMIDALLRV KENNELQFPI ENDNMKAVIL
 301 DLFIAGTETS YTAIIWALSE LMKHPSVMAK AQAEVRKVFK ENENLDENDL DKLPYLKSVI
 361 KETLRMHPPV PLLGPRECRE QTEIDGYTVP LKARVMVNAW AIGRDPESWE DPESFKPERF
 421 ENISVDLTGN HYQFIPFGSG RRMCPGMSFG LVNTGHPLAQ LLYLFDWKFP HKVNAADFHT
 481 TETSRVFAAS KDDLYLIPTN HMEQE
```

FIG. 104

NAME D207-AC4
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 207

```
   1 AACCAACCTT CCTTTTCTTA CTTAGTAAAA TGGATATTCA GTCTTCTCCT TTCAACTTAA
  61 TTGCTTTGCT ACTCTTCATT TCATTTCTTT TTATCCTATT GAAAAAGTGG AATACCAAAA
 121 TCCCAAAGTT ACCTCCAGGT CCATGGAGAC TTCCCCTTAT TGGCAGCCTC CATCACTTGA
 181 AAGGTAAACT CCCACACCAT CATCTTAGAG ATTTAGCCCG AAAATATGGA CCTCTCATGT
 241 ATTTACAACT TGGAGAAGTT CCTGTAGTTG TAATATCTTC GCCACGTATA GCAAAAGCTG
 301 TACTAAAAAC TCATGATCTT GCTTTTGCAA CGAGGCCTCG GTTCATGTCC TCGGACATTG
 361 TGTTTTACAA AAGCAGGGAC ATATCATTCG CCCCATATGG CGATTACTGG AGACAAATGC
 421 GTAAAATATT AACACAAGAA CTCTTGAGTA ACAAGATGCT CAAGTCATTT AGCACAATCC
 481 GAAAGGATGA GCTCTCGAAG CTCCTCTCGT CGATTCGTTT AGCAACAGCT TCTTCTGCAG
 541 TGAACATAAA CGAAAAGCTT CTCTGGTTTA CAAGTTGCAT GACTTGTAGA TTAGCCTTTG
 601 GAAAAATATG CAACGATCGT GATGAATTGA TTATGTTAAT AAGGGAGATA TTAGCATTAT
 661 CAGGAGGATT TGATGTGTGT GATTTGTTCC CTTCATGGAA ATTACTTCAC AATATGAGCA
 721 ACATGAAAGC TAGATTGACG AATGTTCACC ATAAGTATAA TCTAATTATG GAGAATATCA
 781 TCAATGAGCA CAAAGAGAAT CATGCAGCAG GGATAAAGGG AAATAACGAG TTTGGTGGCG
 841 AAGATATGAT TGATGCTTTA CTGAGGGTTA AGGAGAATAA TGAGCTTCAA TTTCCTATCG
 901 AAAATGACAA CATGAAAGCA GTAATTCTGG ACTTGTTTAT TGCTGGAACT GAAACTTCAT
 961 ATACTGCAAT TATATGGGCA CTATCAGAAT TGATGAAGCA CCCAAGTGTT ATGGCCAAGG
1021 CACAAGCTGA AGTGAGAAAA GTCTTCAAAG AAAATGAAAA CTTGGACGAA AATGATCTTG
1081 ACAAGTTGCC ATACTTAAAA TCAGTGATCA AAGAAACACT AAGGATGCAT CCTCCAGTTC
1141 CTTTATTAGG ACCTAGAGAA TGCAGAGAAC AAACTGAGAT TGATGGATAT ACTGTACCTC
1201 TTAAAGCTAG AGTAATGGTT AATGCATGGG CAATTGGAAG AGATCCTGAA AGTTGGGAAG
1261 ATCCTGAAAG TTTCAAACCC GAGCGATTTG AAAATATTTC TGTTGATCTT ACGGGAAATC
1321 ACTATCAGTT CATTCCTTTC GGTTCAGGAA GAAGAATGTG TCCAGGAATG TCGTTTGGTT
1381 TAGTTAACAC TGGGCATCCT TTAGCTCAGT TGCTCTATCT CTTTGACTGG AAATTCCCTC
1441 ATAAGGTTAA TGCAGCTGAT TTTCACACTA CTGAAACAAG TAGAGTTTTT GCAGCAAGCA
1501 AAGATGACCT CTACTTGATT CCAACAAATC ACATGGAGCA AGAGTAGCTC TAAATTGAAT
1561 TCTTGTCTTG GAACAATAAA AGAAGAAACT CCAGCTTGGT CTACATTATT TCCTTTTGCT
1621 TTATATTAGT ATGGGTGTGT TCAGTCTCTT GTTTTTAAGG GTACCCTGAA AGATAAAGGG
1681 CTATATAAAC CAGTGAGACT TTTTATTGGT TGCAAGGTTT TAGATCAAGC CATAAGACAG
1741 CATATTTTAT TCCACCATTT TCTATCATGT TTAATAAAGT TCCTTTCGTT TATTGTTAGA
1801 AAAAAAAAAA AAAAAAAAAA AAA
```

SEQ. ID. NO. 208

```
   1 MDIQSSPFNL IALLLFISFL FILLKKWNTK IPKLPPGPWR LPLIGSLHHL KGKLPHHHLR
  61 DLARKYGPLM YLQLGEVPVV VISSPRIAKA VLKTHDLAFA TRPRFMSSDI VFYKSRDISF
 121 APYGDYWRQM RKILTQELLS NKMLKSFSTI RKDELSKLLS SIRLATASSA VNINEKLLWF
 181 TSCMTCRLAF GKICNDRDEL IMLIREILAL SGGFDVCDLF PSWKLLHNMS NMKARLTNVH
 241 HKYNLIMENI INEHKENHAA GIKGNNEFGG EDMIDALLRV KENNELQFPI ENDNMKAVIL
 301 DLFIAGTETS YTAIIWALSE LMKHPSVMAK AQAEVRKVFK ENENLDENDL DKLPYLKSVI
 361 KETLRMHPPV PLLGPRECRE QTEIDGYTVP LKARVMVNAW AIGRDPESWE DPESFKPERF
 421 ENISVDLTGN HYQFIPFGSG RRMCPGMSFG LVNTGHPLAQ LLYLFDWKFP HKVNAADFHT
 481 TETSRVFAAS KDDLYLIPTN HMEQE
```

FIG. 105

NAME D209-AA10
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 209

```
   1 ATATGCAACT GAGATTTGAA GAATACCAAC TAACCAAAAT GCAGTTCTTC AGCCTGGTTT
  61 CCATTTTCCT ATTTCTATCT TTCCTCTTTT TGTTAAGGGT ATGGAAGAAC TCCAATAGCC
 121 AAAGCAAAAA GTTGCCACCA GGTCCATGGA AACTACCAAT ACTAGGAAGT ATGCTTCATA
 181 TGGTTGGTGG ACTACCACAC CATGTCCTTA GAGATTTAGC CAAAAAATAT GGACCACTTA
 241 TGCACCTTCA ATTAGGTGAA GTTTCTGCGG TTGTGGTTAC TTCTCCTGAT ACGGCAAAAG
 301 AAGTATTAAA AACTCATGAC ATCGCTTTTG CGTCTAGGCC TAGCCTTTTG GCCCCGGAGA
 361 TTGTCTGTTA CAATAGGTCT GATCTAGCCT TTTGCCCCTA TGGCGACTAT TGGAGACAAA
 421 TGCGTAAAAT ATGTGTCTTG GAAGTGCTCA GTGCCAAGAA TGTTCGGACA TTTAGCTCTA
 481 TTAGGCGGAA TGAAGTTCTT CGTCTCATTA ATTTTATCCG GTCATCTTCT GGTGAACCTA
 541 TTAATGTTAC GGAAAGGATC TTTTTGTTCA CAAGCTCCAT GACATGTAGA TCAGCGTTTG
 601 GGCAAGTGTT CAAAGAGCAA GACAAATTTA TACAACTAAT TAAAGAAGTG ATACTCTTAG
 661 CAGGAGGGTT TGATGTGGCT GACATATTCC CTTCACTGAA GTTTCTTCAT GTGCTCAGTG
 721 GAATGAAGGG TAAGATTATG AATGCACACC ATAAGGTAGA TGCCATTGTT GAGAATGTCA
 781 TCAATGAGCA CAAGAAAAAT CTTGCAATTG GGAAAACTAA TGGAGCGTTA GGAGGTGAAG
 841 ATTTAATTGA TGTTCTTCTA AGACTTATGA ATGATGGAGG CCTTCAATTT CCTATCACCA
 901 ACGACAACAT CAAAGCTATA ATTTTTGACA TGTTTGCTGC CGGGACAGAG ACTTCATCGT
 961 CAACAATTGT GTGGGCTATG GTAGAAATGG TGAAAAATCC AGCCGTATTC GCGAAAGCTC
1021 AAGCAGAAGT AAGAGAAGCA TTTAGAGGAA AAGAAACTTT CGATGAAAAT GATGTGGAGG
1081 AGCTAAACTA CCTAAAGTTA GTAATAAAAG AAACTCTAAG ACTTCATCCA CCGGTTCCAC
1141 TTTTGCTCCC AAGAGAATGT AGGGAAGAGA CAAATATAAA CGGCTACACT ATTCCTGTAA
1201 AGACCAAAGT CATGGTTAAT GTTTGGGCTT TGGGAAGAGA TCCAAAATAT TGGAATGACG
1261 CAGAAACTTT TATGCCAGAG AGATTTGAGC AGTGCTCTAA GGATTTTGTT GGTAATAATT
1321 TTGAATATCT TCCATTTGGT GGCGGAAGGA GGATTTGTCC TGGGATTTCG TTTGGCTTAG
1381 CTAATGCTTA TTTGCCATTG GCTCAATTAC TATATCACTT CGATTGGAAA CTCCCTGCTG
1441 GAATCGAACC AAGCGACTTG GACTTGACTG AGTTGGTTGG AGTAACTGCC GCTAGAAAAA
1501 GTGACCTTTA CTTGGTTGCG ACTCCTTATC AACCTCCTCA AAAGTGATTT AATGGTTTCA
1561 AGTTTTTATT TCCTAGCAAA CCCCACTATT GTCCTATCTT TCTTTTGGTG TTTTCGGTTT
1621 TATCTACTCT AATACATGCA TCTTTTACCA TATAGGAATG TACCATGTTG TCG
```

SEQ. ID. NO. 210

```
   1 MQLRFEEYQL TKMQFFSLVS IFLFLSFLFL LRVWKNSNSQ SKKLPPGPWK LPILGSMLHM
  61 VGGLPHHVLR DLAKKYGPLM HLQLGEVSAV VVTSPDTAKE VLKTHDIAFA SRPSLLAPEI
 121 VCYNRSDLAF CPYGDYWRQM RKICVLEVLS AKNVRTFSSI RRNEVLRLIN FIRSSSGEPI
 181 NVTERIFLFT SSMTCRSAFG QVFKEQDKFI QLIKEVILLA GGFDVADIFP SLKFLHVLSG
 241 MKGKIMNAHH KVDAIVENVI NEHKKNLAIG KTNGALGGED LIDVLLRLMN DGGLQFPITN
 301 DNIKAIIFDM FAAGTETSSS TIVWAMVEMV KNPAVFAKAQ AEVREAFRGK ETFDENDVEE
 361 LNYLKLVIKE TLRLHPPVPL LLPRECREET NINGYTIPVK TKVMVNVWAL GRDPKYWNDA
 421 ETFMPERFEQ CSKDFVGNNF EYLPFGGGRR ICPGISFGLA NAYLPLAQLL YHFDWKLPAG
 481 IEPSDLDLTE LVGVTAARKS DLYLVATPYQ PPQK
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FIG. 106

```
NAME         D209-AA12
ORGANISM     NICOTIANA TABACUM
SEQ. ID. NO. 211
   1 ATATGCAACT GAGATTTGAA GAATACCAAC TAACCAAAAT GCAGTTCTTC AGCTTGGTTT
  61 CCATTTTCCT ATTTCTATCT TTCCTCTTTT TGTTAAGGAT ATGGAAGAAC TCCAATAGCC
 121 AAAGCAAAAA GTTGCCACCA GGTCCATGGA AACTACCAAT ACTAGGAAGT ATGCTTCATA
 181 TGGTTGGTGG ACTACCACAC CATGTCCTTA GAGATTTAGC CAAAAAATAT GGACCACTTA
 241 TGCACCTTCA ATTAGGTGAA GTTTCTGCGG TTGTGGTTAC TTCTCCTGAT ACGGCAAAAG
 301 AAGTATTAAA AACTCATGAC ATCGCTTTTG CGTCTAGGCC TAGCCTTTTG GCCCCGGAGA
 361 TTGTCTGTTA CAATAGGTCT GATCTAGCCT TTTGCCCCTA TGGCGACTAT TGGAGACAAA
 421 TGCGTAAAAT ATGTGTCTTG GAAGTGCTCA GTGCCAAGAA TGTTCGGACA TTTAGCTCTA
 481 TTAGGCGGAA TGAAGTTCTT CGTCTCATTA ATTTTATCCG GTCATCTTCT GGTGAACCTA
 541 TTAATGTTAC GGAAAGGATC TTTTTGTTCA CAAGCTCCAT GACATGTAGA TCAGCGTTTG
 601 GGCAAGTGTT CAAAGAGCAA GACAAATTTA TACAACTAAT TAAAGAAGTG ATACTCTTAG
 661 CAGGAGGGTT TGATGTGGCT GACATATTCC CTTCACTGAA GTTTCTTCAT GTGCTCAGTG
 721 GAATGAAGGG TAAGATTATG AATGCACACC ATAAGGTAGA TGCCATTGTT GAGAATGTCA
 781 TCAATGAGCA CAAGAAAAAT CTTGCAATTG GGAAAACTAA TGGAGCGTTA GGAGGTGAAG
 841 ATTTAATTGA TGTTCTTCTA AGACTTATGA ATGATGGAGG CCTTCAATTT CCTATCACCA
 901 ACGACAACAT CAAAGCCATA ATTTTTGACA TGTTTGCTGC CGGGACAGAG ACTTCATCGT
 961 CAACAATTGT GTGGGCTATG GTAGAAATGG TGAAAAATCC AGCCGTATTC GCGAAAGCTC
1021 AAGCAGAAGT AAGAGAAGCA TTTAGAGGAA AAGAAACTTT CGATGAAAAT GATGTGGAGG
1081 AGCTAAACTA CCTAAAGTTA GTAATAAAAG AAACTCTAAG ACTTCATCCA CCGGTTCCAC
1141 TTTTGCTCCC AAGAGAATGT AGGGAAGAGA CAAATATAAA CGGCTACACT ATTCCTGTAA
1201 AGACCAAAGT CATGGTTAAT GTTTGGGCTT TGGGAAGAGA TCCAAAATAT TGGAATGACG
1261 CAGAAACTTT TATGCCAGAG AGATTTGAGC AGTGCTCTAA GGATTTTGTT GGTAATAATT
1321 TTGAATATCT TCCATTTGGT GGCGGAAGGA GGATTTGTCC TGGGATTTCG TTTGGCTTAG
1381 CTAATGCTTA TTTGCCATTG GCTCAATTAC TATATCACTT CGATTGGAAA CTCCCTGCTG
1441 GAATCGAACC AAGCGACTTG GACTTGACTG AGTTGGTTGG AGTAACTGCC GCTAGAAAAA
1501 GTGACCTTTA CTTGGTTGCG ACTCCTTATC AACCTCCTCA AAAGTGATTT AATGGTTTCA
1561 AGTTTTTATT TCCTAGCAAA CCCCACTATT GTCCTATCTT TCTTTTGGTG TTTTCGGTTT
1621 TATCTACTCT AATACATGCA TCTTTTACCA TATAGGAATG TACCATGTTG TCG

SEQ. ID. NO. 212
   1 MQLRFEEYQL TKMQFFSLVS IFLFLSFLFL LRIWKNSNSQ SKKLPPGPWK LPILGSMLHM
  61 VGGLPHHVLR DLAKKYGPLM HLQLGEVSAV VVTSPDTAKE VLKTHDIAFA SRPSLLAPEI
 121 VCYNRSDLAF CPYGDYWRQM RKICVLEVLS AKNVRTFSSI RRNEVLRLIN FIRSSSGEPI
 181 NVTERIFLFT SSMTCRSAFG QVFKEQDKFI QLIKEVILLA GGFDVADIFP SLKFLHVLSG
 241 MKGKIMNAHH KVDAIVENVI NEHKKNLAIG KTNGALGGED LIDVLLRLMN DGGLQFPITN
 301 DNIKAIIFDM FAAGTETSSS TIVWAMVEMV KNPAVFAKAQ AEVREAFRGK ETFDENDVEE
 361 LNYLKLVIKE TLRLHPPVPL LLPRECREET NINGYTIPVK TKVMVNVWAL GRDPKYWNDA
 421 ETFMPERFEQ CSKDFVGNNF EYLPFGGGRR ICPGISFGLA NAYLPLAQLL YHFDWKLPAG
 481 IEPSDLDLTE LVGVTAARKS DLYLVATPYQ PPQK
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FIG. 107

NAME D209-AH10
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 213

```
   1 ATATGCAACT GAGATTTGAA GAATACCAAC TAACCAAAGT GCAGTTCTTC AGCTTGGTTT
  61 CCATTTTCCT ATTTCTATCT TTCCTCTTTT TGTTAAGGAT ATGGAAGAAC TCCAATAGCC
 121 AAAGCAAAAA GTTGCCACCA GGTCCATGGA AACTACCAAT ACTAGGAAGT ATGCTTCATA
 181 TGGTTGGTGG ACTACCACAC CATGTCCTTA GAGATTTAGC CAAAAAATAT GGACCACTTA
 241 TGCACCTTCA ATTAGGTGAA GTTTCTGCGG TTGTGGTTAC TTCTCCTGAT ACGGCAAAAG
 301 AAGTATTAAA AACTCATGAC ATCGCTTTTG CGTCTAGGCC TAGCCTTTTG GCCCCGGAGA
 361 TTGTCTGTTA CAATAGGTCT GATCTAGCCT TTTGCCCCTA TGGCGACTAT TGGAGACAAA
 421 TGCGTAAAAT ATGTGTCTTG GAAGTGCTCA GTGCCAAGAA TGTTCGGACA TTTAGCTCTA
 481 TTAGGCGGAA TGAAGTTCTT CGTCTCATTA ATTTTATCCG GTCATCTTCT GGTGAACCTA
 541 TTAATGTTAC GGAAAGGATC TTTTTGTTCA CAAGCTCCAT GACATGTAGA TCAGCGTTTG
 601 GGCAAGTGTT CAAAGAGCAA GACAAATTTA TACAACTAAT TAAAGAAGTG ATACTCTTAG
 661 CAGGAGGGTT TGATGTGGCT GACATATTCC CTTCACTGAA GTTTCTTCAT GTGCTCAGTG
 721 GAATGAAGGG TAAGATTATG AATGCACACC ATAAGGTAGA TGCCATTGTT GAGAATGTCA
 781 TCAATGAGCA CAAGAAAAAT CTTGCAATTG GGAAAACTAA TGGAGCGTTA GGAGGTGAAG
 841 ATTTAATTGA TGTTCCTCTA AGACTTATGA ATGATGGAGG CCTTCAATTT CCTATCACCA
 901 ACGACAACAT CAAAGCTATA ATTTTTGACA TGTTTGCTGC CGGGACGGAG ACTTCATCGT
 961 CAACAATTGT GTGGGCTATG GTAGAAATGG TGAAAAATCC AGCCGTATTC GCGAAAGCTC
1021 AAGCAGAAGT AAGAGAAGCA TTTAGAGGAA AAGAAACTTT CGATGAAAAT GATGTGGAGG
1081 AGCTAAACTA CCTAAAGTTA GTAATAAAAG AAACTCTAAG ACTTCATCCA CCGGTTCCAC
1141 TTTTGCTCCC AAGAGAATGT AGGGAAGAGA CAAATATAAA CGGCTACACT ATTCCTGTAA
1201 AGACCAAAGT CATGGTTAAT GTTTGGGCTT TGGGAAGAGA TCCAAAATAT TGGAATGACG
1261 CAGAAACTTT TATGCCAGAG AGATTTGAGC AGTGCTCTAA GGATTTTGTT GGTAATAATT
1321 TTGAATATCT TCCATTTGGT GGCGGAAGGA GGATTTGTCC TGGGATTTCG TTTGGCTTAG
1381 CTAATGCTTA TTTGCCATTG GCTCAATTAC TATATCACTT CGATTGGAAA CTCCCTGCTG
1441 GAATCGAACC AAGCGACTTG GACTTGACTG AGTTGGTTGG AGTAACTGCC GCTAGAAAAA
1501 GTGACCTTTA CTTGGTTGCG ACTCCTTATC AACCTCCTCA AAAGTGATTT AATGGTTTCA
1561 AGTTTTTATT TCCTAGCAAA CCCCACTATT GTCCTATCTT TCTTTTGGTG TTTTCGGTTT
1621 TATCTACTCT AATACATGCA TCTTTTACCA TATAGGAATG TACCATGTTG TCG
```

SEQ. ID. NO. 214

```
   1 MQLRFEEYQL TKVQFFSLVS IFLFLSFLFL LRIWKNSNSQ SKKLPPGPWK LPILGSMLHM
  61 VGGLPHHVLR DLAKKYGPLM HLQLGEVSAV VVTSPDTAKE VLKTHDIAFA SRPSLLAPEI
 121 VCYNRSDLAF CPYGDYWRQM RKICVLEVLS AKNVRTFSSI RRNEVLRLIN FIRSSSGEPI
 181 NVTERIFLFT SSMTCRSAFG QVFKEQDKFI QLIKEVILLA GGFDVADIFP SLKFLHVLSG
 241 MKGKIMNAHH KVDAIVENVI NEHKKNLAIG KTNGALGGED LIDVPLRLMN DGGLQFPITN
 301 DNIKAIIFDM FAAGTETSSS TIVWAMVEMV KNPAVFAKAQ AEVREAFRGK ETFDENDVEE
 361 LNYLKLVIKE TLRLHPPVPL LLPRECREET NINGYTIPVK TKVMVNVWAL GRDPKYWNDA
 421 ETFMPERFEQ CSKDFVGNNF EYLPFGGGRR ICPGISFGLA NAYLPLAQLL YHFDWKLPAG
 481 IEPSDLDLTE LVGVTAARKS DLYLVATPYQ PPQK
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FIG. 108

NAME D87A-AF3
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 215

```
   1 GAAATGGGAA ATGCTCACAA CAGCAAAATT GCAGCAATCT GTTTGATAAT TTTCTTGGTA
  61 TATAAAGCAT GGGAATTGTT GAAGTGGATA TGGATTAAGC CAAAGAAACT GGAGAGTTGC
 121 CTCAGAAAAC AGGGACTCAA AGGAAATTCC TACAGGCTAT TCTATGGAGA TATGAAAGAA
 181 TTGTCCAAAA GTCTCAAGGA AATCAATTCA AAGCCCATCA TCAATCTATC AAATGAAGTA
 241 GCCCCAAGAA TCATTCCTTA TTATCTTGAA ATCATCCAAA AATATGGTAA AAGATGTTTT
 301 GTTTGGCAAG GACCAACCCC CGCAATATTA ATAACAGAGC CAGAATTAAT AAAGGAGATA
 361 TTTGGTAAGA ACTATGTTTT TCAGAAGCCT AATAATCCCA ACCCACTGAC CAAGTTATTG
 421 GCTCGAGGTG TTGTAAGCTA CGAGGAAGAA AAATGGGCAA AACACAGAAA GATCTTAAAC
 481 CCTGCCTTTC ATATGGAGAA GTTGAAGCAT ATGCTACCAG CATTTTACTT GAGCTGTAGT
 541 GAGATGCTGA ACAAATGGGA GGAGATTATC CCAGTAAAAG AATCAAATGA GTTGGACATT
 601 TGGCCTCATC TTCAAAGAAT GACAAGTGAT GTGATTTCTC GTGCTGCCTT TGGTAGTAGC
 661 TACGAAGAAG GAAGAAGAAT ATTTGAACTT CAAGAAGAAC AAGCTGAGTA TCTAACGAAG
 721 ACATTCAATT CAGTTTATAT CCCAGGTTCC AGATTTTTTC CCAATAAAAT GAACAAAAGA
 781 ATGAAAGAAT GTGAAAAGGA AGTACGAGAA ACAATTACGT GTCTAATTGA CAACAGATTA
 841 AAGGCAAAAG AAGAAGGCAA TGGCAAGGCC CTCAATGATG ACCTACTGGG TATATTATTA
 901 GAGTCAAATT CTATAGAAAT TGAAGAACAT GGTAACAAGA AGTTTGGAAT GAGTATACCT
 961 GAAGTAATTG AAGAGTGCAA ATTATTCTAT TTTGCTGGCC AAGAGACTAC ATCAGTATTG
1021 CTTGTGTGGA CACTGATTTT GTTAGGGAGA AATCCAGAAT GGCAGGAACG TGCTAGAGAG
1081 GAAGTTTTTC AAGCCTTTGG AAGTGATAAA CCAACTTTTG ACGAATTATA TCGCTTGAAA
1141 ATTGTGACGA TGATTTTGTA CGAGTCTTTA AGGTTATATC CACCAATAGC AACTCGTACT
1201 CGAAGGACTA ATGAAGAAAC AAAATTAGGG GAACTAGATT TACCAAAGGG TGCACTGCTC
1261 TTTATACCAA CAATCTTATT ACATCTTGAC AAGGAAATTT GGGGTGAAGA TGCAGATGAG
1321 TTCAATCCGG AGAGATTTAG CGAAGGGGTG GCAAAGGCAA CAAAGGGGAA AATGACATAT
1381 TTTCCATTTG GTGCAGGACC GCGAAAATGC ATTGGGCAAA ACTTCGCGAT TTTGGAAGCA
1441 AAAATGGCTA TAGCTATGAT TCTACAACGC TTCTCCTTCG AGCTCTCTCC ATCTTATACA
1501 CACTCTCCAT ACACTGTGGT CACTTTGAAA CCCAAATATG GTGCTCCCCT AATAATGCAC
1561 AGGCTGTAGT CCTGTGAGAA
```

SEQ. ID. NO. 216

```
   1 MGNAHNSKIA AICLIIFLVY KAWELLKWIW IKPKKLESCL RKQGLKGNSY RLFYGDMKEL
  61 SKSLKEINSK PIINLSNEVA PRIIPYYLEI IQKYGKRCFV WQGPTPAILI TEPELIKEIF
 121 GKNYVFQKPN NPNPLTKLLA RGVVSYEEEK WAKHRKILNP AFHMEKLKHM LPAFYLSCSE
 181 MLNKWEEIIP VKESNELDIW PHLQRMTSDV ISRAAFGSSY EEGRRIFELQ EEQAEYLTKT
 241 FNSVYIPGSR FFPNKMNKRM KECEKEVRET ITCLIDNRLK AKEEGNGKAL NDDLLGILLE
 301 SNSIEIEEHG NKKFGMSIPE VIEECKLFYF AGQETTSVLL VWTLILLGRN PEWQERAREE
 361 VFQAFGSDKP TFDELYRLKI VTMILYESLR LYPPIATRTR RTNEETKLGE LDLPKGALLF
 421 IPTILLHLDK EIWGEDADEF NPERFSEGVA KATKGKMTYF PFGAGPRKCI GQNFAILEAK
 481 MAIAMILQRF SFELSPSYTH SPYTVVTLKP KYGAPLIMHR L
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FIG. 109

NAME D208-AC8
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 217

```
   1 ATGCTTTCTC CCATAGAAGC CTTTGTAGGA CTAGTAACCT TCACATTTCT CTTATACTTC
  61 CTATGGACAA AAAAATCTCA AAAACTTCCA AAACCCTTAC CACCGAAAAT CCCCGGAGGA
 121 TGGCCGGTAA TCGGCCATCT TTTTCACTTC AATAACGACG GCGACGACCG TCCATTAGCT
 181 CGAAAGCTCG GAGACTTAGC TGATAAATAC GGCCCCGTTT TCACTTTTCG GCTAGGTCTT
 241 CCCCTTGTGC TAGTTGTAAG CAGTTACGAA GCTATAAAAG ATTGCTTCTC TACAAATGAT
 301 GCCATTTTCT CCAATCGTCC AGCTCTTCTT TACGGCGAAT ACCTTGGCTA CAATAATACA
 361 ATGCTTTTTC TAGCAAATTA CGGACCTTAC TGGCGAAAAA ATCGTAAATT AGTCATTCAG
 421 GAAGTTCTCT CTGCTAGTCG TCTCGAAAAA TTCAAACAAG TGAGATTCAC CAGAATTCAA
 481 ACGAGCATTA AGAATTTATA CACTCGAATT AATGGAAATT CGAGTACGAT AAATCTAACT
 541 GATTGGTTAG AAGAATTGAA TTTTGGTCTG ATCGTGAAAA TGATCGCTGG GAAAAATTAT
 601 GAATCCGGTA AAGGAGATGA ACAAGTGGAA AGATTTAAGA ATGCGTTTAA GGATTTTATG
 661 GTTTTATCAA TGGAATTTGT ATTATGGGAT GCATTTCCAA TTCCATTATT TAAATGGGTG
 721 GATTTTCAAG GTCATATTAA GGCAATGAAA AGGACATTTA AGGATATAGA TTCTGTTTTT
 781 CAGAACTGGT TAGAGGAACA TATTAATAAA AGAGAAAAAA TAGAGGTTGG TGCAGAAGGG
 841 AATGAACAAG ATTTCATTGA TGTGGTGCTT TCAAAATTGA GTAAAGAATA TCTTGATGAA
 901 GGTTACTCTC GTGATACTGT CATTAAAGCA ACAGTTTTTA GTTTGGTCTT GGATGCAGCA
 961 GACACAGTTG CTCTTCACAT AAATTGGGGA ATGACATTAT TGATAAACAA TCAAAATGCC
1021 TTGATGAAAG CACAAGAAGA GATAGACACA AAAGTTGGTA AGGATAGATG GGTAGAAGAG
1081 AGTGATATTA AGGATTTAGT ATACCTCCAA GCTATTGTTA AAAAGGTGTT ACGATTATAT
1141 CCACCAGGAC CTTTGTTAGT ACCACATGAA AATGTAAAGG ATTGTGTTGT TAGTGGATAT
1201 CACATTCCTA AAGGGACTAG ATTATTCGCA AACGTCATGA AACTGCAGCG CGATCCTAAA
1261 CTCTTGTCAA ATCCTGATAA GTTCGATCCA GAGAGATTCA TCGCTGGTGA TATTGACTTC
1321 CGTGGTCACC ACTATGAGTT TATCCCATTT GGTTCTGGAA GACGATCTTG TCCGGGGATG
1381 ACTTATGCAT TGCAAGTGGA ACACCTAACA ATGGCACATT TAATCCAGGG TTTCAATTAC
1441 AAAACTCCAA ATGACGAGGC CTTGGATATG AAGGAAGGTG CAGGCATAAC AATACGTAAG
1501 GTAAATCCAG TGGAATTGAT AATAACGCCT CGCTTGGCAC CTGAGCTTTA CTAAAACCTA
1561 AGATGTTTCA TCTTGGTTGA TCATTGT
```

SEQ. ID. NO. 218

```
   1 MLSPIEAFVG LVTFTFLLYF LWTKKSQKLP KPLPPKIPGG WPVIGHLFHF NNDGDDRPLA
  61 RKLGDLADKY GPVFTFRLGL PLVLVVSSYE AIKDCFSTND AIFSNRPALL YGEYLGYNNT
 121 MLFLANYGPY WRKNRKLVIQ EVLSASRLEK FKQVRFTRIQ TSIKNLYTRI NGNSSTINLT
 181 DWLEELNFGL IVKMIAGKNY ESGKGDEQVE RFKNAFKDFM VLSMEFVLWD AFPIPLFKWV
 241 DFQGHIKAMK RTFKDIDSVF QNWLEEHINK REKIEVGAEG NEQDFIDVVL SKLSKEYLDE
 301 GYSRDTVIKA TVFSLVLDAA DTVALHINWG MTLLINNQNA LMKAQEEIDT KVGKDRWVEE
 361 SDIKDLVYLQ AIVKKVLRLY PPGPLLVPHE NVKDCVVSGY HIPKGTRLFA NVMKLQRDPK
 421 LLSNPDKFDP ERFIAGDIDF RGHHYEFIPF GSGRRSCPGM TYALQVEHLT MAHLIQGFNY
 481 KTPNDEALDM KEGAGITIRK VNPVELIITP RLAPELY
```

FIG. 110

NAME D215-AB5
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 219

```
   1 GGGAGAAGGC CTTCAATATG GAGATACCAT ATTACAGCTT AAAAATTGCA ATTTCTTCAT
  61 TTGCAATTAT CTTTGTACTA AGATGGGCAT GGAAAATCTT GAATTATGTG TGGTTAAAAC
 121 CAAAAGAATT GGAGAAATAC CTCAGACAGC AGGGTTTCAA AGGAAACTCT TACAAATTCT
 181 TGTTTGGGGA TATGAAAGAG ACGAAGAAAA TGGGTGAAGA AGCTATGTCT AAGCCAATCA
 241 ATTTCTCTCA TGACATGATT TGGCCTAGAG TTATGCCATT CATCCACAAA ACCATCACCA
 301 ATTATGGTAA GAATTGTATT GTGTGGTTTG GGCCAAGACC AGCAGTCCTG ATCACAGACC
 361 CGGAACTTGT AAAGGAGGTG CTAACGAAGA ATTTCGTCTA TCAGAAGCCG CTTGGCAATC
 421 CACTCACAAA GTTGGCAGCA ACTGGAATTG CAGGCTATGA AACAGATAAA TGGGCTACAC
 481 ATAGAAGGCT TCTCAATCCT GCTTTTCACC TTGACAAGTT GAAGCATATG CTACCTGCAT
 541 TCCAATTTAC TGCTAGTGAG ATGTTGAGCA AATTGGAGAA AGTTGTTTCA CCAAACGGAA
 601 CAGAGATAGA TGTGTGGCCA TATTTACAAA CTTTGACAAG TGATGCCATT TCAAGAACTG
 661 CGTTTGGAAG TAGTTATGAA GAAGGAAGAA AGATTTTTGA CCTTCAAAAA GAACAACTTT
 721 CACTAATTCT AGAAGTTTCA CGCACAATAT ATATTCCAGG ATGGAGGTTT TTGCCAACGA
 781 AAAGGAACAA AAGGATGAAG CAAATATTTA ATGAAGTACG AGCACTGGTA TTTGGAATTA
 841 TTAAGAAAAG GATGAGTATG ATTGAAAATG GAGAAGCACC TGATGATTTA TTGGGAATAT
 901 TATTGGCATC CAATTTAAAA GAAATCCAAC AACATGGAAA CAACAAGAAA TTTGGTATGA
 961 GTATTGATGA GGTGATTGAA GAGTGTAAAC TCTTCTATTT TGCTGGGCAA GAGACTACTT
1021 CATCTTTACT TGTATGGACT ATGATTTTGT TGTGCAAATA TCCTAATTGG CAAGATAAAG
1081 CTAGAGAAGA GGTTTTGCAA GTGTTTGGGA GTAGGGAAGT TGACTATGAC AAGTTGAATC
1141 AGCTAAAAAT AGTAACTATG ATCTTAAACG AGGTCTTAAG GTTGTATCCA GCAGGATATG
1201 TGATTAATCG AATGGTAAAC AAAGAAACAA AGTTAGGGAA TTTGTGTTTA CCAGCCGGCG
1261 TACAGCTCGT GTTACCAACA ATGTTGTTGC AACATGATAC TGAAATATGG GGAGATGATG
1321 CAATGGAGTT CAATCCAGAG AGATTTAGTG ATGGAATATC CAAAGCAACA AAAGGAAAAC
1381 TTGTGTTTTT TCCATTTAGT TGGGGTCCAA GAATATGTAT TGGGCAAAAT TTTGCTATGT
1441 TAGAGGCTAA AATGGCAATG GCTATGATTC TGAAAACCTA TGCATTTGAA CTCTCTCCAT
1501 CTTATGCTCA TGCTCCTCAT CCACTACTAC TTCAACCTCA ATATGGTGCT CAATTAATTT
1561 TGTACAAGTT GTAGATATGG TCAATCTGGA ACTTGTTATG GAACTTTTAT CATCGTAATC
1621 AACCATATTG AGGG
```

SEQ. ID. NO. 220

```
   1 MEIPYYSLKI AISSFAIIFV LRWAWKILNY VWLKPKELEK YLRQQGFKGN SYKFLFGDMK
  61 ETKKMGEEAM SKPINFSHDM IWPRVMPFIH KTITNYGKNC IVWFGPRPAV LITDPELVKE
 121 VLTKNFVYQK PLGNPLTKLA ATGIAGYETD KWATHRRLLN PAFHLDKLKH MLPAFQFTAS
 181 EMLSKLEKVV SPNGTEIDVW PYLQTLTSDA ISRTAFGSSY EEGRKIFDLQ KEQLSLILEV
 241 SRTIYIPGWR FLPTKRNKRM KQIFNEVRAL VFGIIKKRMS MIENGEAPDD LLGILLASNL
 301 KEIQQHGNNK KFGMSIDEVI EECKLFYFAG QETTSSLLVW TMILLCKYPN WQDKAREEVL
 361 QVFGSREVDY DKLNQLKIVT MILNEVLRLY PAGYVINRMV NKETKLGNLC LPAGVQLVLP
 421 TMLLQHDTEI WGDDAMEFNP ERFSDGISKA TKGKLVFFPF SWGPRICIGQ NFAMLEAKMA
 481 MAMILKTYAF ELSPSYAHAP HPLLLQPQYG AQLILYKL
```

FIG. 111

NAME D103-AH3
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 221

```
   1 ATGGTTTTTC CCATAGAAGC CTTTGTAGGA CTAGTAACCT TCACATTTCT CTTATACTTC
  61 CTATGGACAA AAAAATCTCA AAAACTTCCA AAACCCTTAC CACCGAAAAT CCCCGGAGGA
 121 TGGCCGGTAA TCGGCCACCT TTTTCACTTC AATAACGACG GCGACGACCG TCCATTAGCT
 181 CGAAAACTCG GAGACTTAGC TGATAAATAC GGCCCCGTTT TCACTTTTCG GCTAGGTCTT
 241 CCCCTTGTGC TAGTTGTAAG CAGTTACGAA GCTACAAAAG ATTGCTTCTC TACAAATGAC
 301 GCCATTTTCT CCAATCGTCC AGCTTTTCTT TACGGCGAAT ACCTTGGCTA CAATAATACA
 361 ATGCTTTTTC TAGCAAATTA CGGACCTTAC TGGCGAAAAA ATCGTAAATT AGTCATTCAG
 421 GAAGTTCTCT CTGCTAGTCG TCTCGAAAAA TTCAAACAAG TGAGATTCAC CAGAATTCAA
 481 ACGAGCATTA AGAATTTATA CACTCGAATT AATGGAAATT CGAGTACGAT AAATCTAACT
 541 GATTGGTTAG AAGAATTGAA TTTTGGTCTG ATCGTGAAAA TGATCGCTGG GAAAAATTAT
 601 GAATCCGGTA AAGGAGATGA ACAAGTGGAA AGATTTAAGA ATGCGTTTAA GGATTTTATG
 661 GTTTTATCAA TGGAATTTGT ATTATGGGAT GCATTTCCAA TTCCATTATT TAAATGGGTG
 721 GATTTTCAAG GTCATATTAA GACAATGAAA AGGACATTTA AGGATATAGA TTCTGTTTTT
 781 CAGAACTGGT TAGAGGAACA TATTAATAAA AGAGAAAAAA TGGAGGTTGG TGCAGAAGGG
 841 AATGAACAAG ATTTCATTGA TGTGGTGCTT TCAAAATTGA GTAAAGAATA TCTTGATGAA
 901 GGTTACTCTC GTGATACTGT CATTAAAGCA ACAGTTTTTA GTTTGGTCTT GGATGCAGCA
 961 GACACAGTTG CTCTTCACAT AAATTGGGGA ATGACATTAT TGATAAACAA TCAAAATGCC
1021 TTGATGAAAG CACAAGAAGA GATAGACACA AAAGTTGGTA AGGATAGATG GGTAGAAGAG
1081 AGTGATATTA AGGATTTAGT ATACCTCCAA GCTATTGTTA AAAAGGTGTT ACGATTATAT
1141 CCACCAGGAC CTTTGTTAGT ACCACATGAA AATGTAAAGG ATTGTGTTGT TAGTGGATAT
1201 CACATTCCTA AAGGGACTAG ATTATTCGCA AACGTCATGA AACTGCAGCG CGATCCTAAA
1261 CTCTTGTCAA ATCCTGATAA GTTCGATCCA GAGAGATTCA TCGCTGGTGA TATTGACTTC
1321 CGTGGTCACC ACTATGAGTT TATCCCATCT GGTTCTGGAA GACGATCTTG TCCGGGGATG
1381 ACTTATGCAT TGCAAGTGGA ACACCTAACA ATGGCACATT TAATCCAGGG TTTCAATTAC
1441 AAAACTCCAA ATGACGAGGT CTTGGATATG AAGGAAGGTG CAGGCATAAC AATACGTAAG
1501 GTAAATCCAG TGGAATTGAT AATAACGCCT CGCTTGGCAC CTGAGCTTTA CTAAAACCTA
1561 AGATCTTTCA TCTTGGTTGA TCATTGTTTA ATA
```

SEQ. ID. NO. 222

```
   1 MVFPIEAFVG LVTFTFLLYF LWTKKSQKLP KPLPPKIPGG WPVIGHLFHF NNDGDDRPLA
  61 RKLGDLADKY GPVFTFRLGL PLVLVVSSYE ATKDCFSTND AIFSNRPAFL YGEYLGYNNT
 121 MLFLANYGPY WRKNRKLVIQ EVLSASRLEK FKQVRFTRIQ TSIKNLYTRI NGNSSTINLT
 181 DWLEELNFGL IVKMIAGKNY ESGKGDEQVE RFKNAFKDFM VLSMEFVLWD AFPIPLFKWV
 241 DFQGHIKTMK RTFKDIDSVF QNWLEEHINK REKMEVGAEG NEQDFIDVVL SKLSKEYLDE
 301 GYSRDTVIKA TVFSLVLDAA DTVALHINWG MTLLINNQNA LMKAQEEIDT KVGKDRWVEE
 361 SDIKDLVYLQ AIVKKVLRLY PPGPLLVPHE NVKDCVVSGY HIPKGTRLFA NVMKLQRDPK
 421 LLSNPDKFDP ERFIAGDIDF RGHHYEFIPS GSGRRSCPGM TYALQVEHLT MAHLIQGFNY
 481 KTPNDEVLDM KEGAGITIRK VNPVELIITP RLAPELY
```

FIG. 112

```
NAME         D208-AD9
ORGANISM     NICOTIANA TABACUM
SEQ. ID. NO. 223
     1 ATGCTTTCTC CCATAGAAGC CATTGTAGGA CTAGTAACCT TCACATTTCT CTTCTTCTTC
    61 CTATGGACAA AAAAATCTCA AAAACCTTCA AAACCCTTAC CACCGAAAAT CCCCGGAGGA
   121 TGGCCGGTAA TCGGCCATCT TTTCCACTTC AATGACGACG GCGACGACCG TCCATTAGCT
   181 CGAAAACTCG GAGACTTAGC TGACAAATAC GGCCCCGTTT TCACTTTTCG GCTAGGCCTT
   241 CCCCTTGTCT TAGTTGTAAG CAGTTACGAA GCTGTAAAAG ACTGTTTCTC CACAAATGAC
   301 GCCATTTTTT CCAATCGTCC AGCTTTTCTT TACGGCGATT ACCTTGGCTA CAATAATGCC
   361 ATGCTATTTT TGGCCAATTA CGGACCTTAC TGGCGAAAAA ATCGAAAATT AGTTATTCAG
   421 GAAGTTCTCT CCGCTAGTCG TCTCGAAAAA TTCAAACACG TGAGATTTGC AAGAATTCAA
   481 GCGAGCATGA AGAATTTATA TACTCGAATT GATGGAAATT CGAGTACGAT AAATTTAACT
   541 GATTGGTTAG AAGAATTGAA TTTTGGTCTG ATCGTGAAGA TGATCGCTGG AAAAAATTAT
   601 GAATCCGGTA AAGGAGATGA ACAAGTGGAG AGATTTAAGA AAGCGTTTAA GGATTTTATG
   661 ATTTTATCAA TGGAGTTTGT GTTATGGGAT GCATTTCCAA TTCCATTATT TAAATGGGTG
   721 GATTTTCAAG GGCATGTTAA GGCTATGAAA AGGACTTTTA AAGATATAGA TTCTGTTTTT
   781 CAGAATTGGT TAGAGGAACA TATTAATAAA AGAGAAAAAA TGGAGGTTAA TGCAGAAGGG
   841 AATGAACAAG ATTTCATTGA TGTGGTGCTT TCAAAAATGA GTAATGAATA TCTTGGTGAA
   901 GGTTACTCTC GTGATACTGT CATTGAAGCA ACGGTGTTTA GTTTGGTCTT GGATGCAGCA
   961 GACACAGTTG CTCTTCACAT AAATTGGGGA ATGGCATTAT TGATAAACAA TCAAAAGGCC
  1021 TTGACGAAAG CACAAGAAGA GATAGACACA AAAGTTTGTA AGGACAGATG GGTAGAAGAG
  1081 AGTGATATTA AGGATTTGGT ATACCTCCAA GCTATTGTTA AAGAAGTGTT ACGATTATAT
  1141 CCACCAGGAC CTTTGTTAGT ACCACACGAA AATGTAGAAG ATTGTGTTGT TAGTGGATAT
  1201 CACATTCCTA AAGGGACAAG ATTATTCGCA AACGTCATGA AACTGCAACG TGATCCTAAA
  1261 CTCTGGTCTG ATCCTGATAC TTTCGATCCA GAGAGATTCA TTGCTACTGA TATTGACTTT
  1321 CGTGGTCAGT ACTATAAGTA TATCCCGTTT GGTCCTGGAA GACGATCTTG TCCAGGGATG
  1381 ACTTATGCAT TGCAAGTGGA ACACTTAACA ATGGCACATT TGATCCAAGG TTTCAATTAC
  1441 AGAACTCCAA ATGACGAGCC CTTGGATATG AAGGAAGGTG CAGGCATAAC TATACGTAAG
  1501 GTAAATCCTG TGGAACTGAT AATAGCGCCT CGCCTGGCAC CTGAGCTTTA TTAAAACCTA
  1561 AGATGTTTCA TCTTGGTTGA

SEQ. ID. NO. 224
     1 MLSPIEAIVG LVTFTFLFFF LWTKKSQKPS KPLPPKIPGG WPVIGHLFHF NDDGDDRPLA
    61 RKLGDLADKY GPVFTFRLGL PLVLVVSSYE AVKDCFSTND AIFSNRPAFL YGDYLGYNNA
   121 MLFLANYGPY WRKNRKLVIQ EVLSASRLEK FKHVRFARIQ ASMKNLYTRI DGNSSTINLT
   181 DWLEELNFGL IVKMIAGKNY ESGKGDEQVE RFKKAFKDFM ILSMEFVLWD AFPIPLFKWV
   241 DFQGHVKAMK RTFKDIDSVF QNWLEEHINK REKMEVNAEG NEQDFIDVVL SKMSNEYLGE
   301 GYSRDTVIEA TVFSLVLDAA DTVALHINWG MALLINNQKA LTKAQEEIDT KVCKDRWVEE
   361 SDIKDLVYLQ AIVKEVLRLY PPGPLLVPHE NVEDCVVSGY HIPKGTRLFA NVMKLQRDPK
   421 LWSDPDTFDP ERFIATDIDF RGQYYKYIPF GPGRRSCPGM TYALQVEHLT MAHLIQGFNY
   481 RTPNDEPLDM KEGAGITIRK VNPVELIIAP RLAPELY
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FIG. 113

NAME D237-AD1
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 225

```
   1 TTTCATATAC CTTTAGTACT CTTGAAATTT TCAAATAATG GTTTATCTTC TTTCTCCCAT
  61 AGAAGCCATT GTAGGATTTG TAACCTTTTC ATTTCTATTC TACTTTCTAT GGACCAAAAA
 121 ACAATCAAAA ATCTTAAACC CACTACCTCC AAAAATCCCA GGTGGATGGC CAGTAATCGG
 181 CCATCTCTTT TATTTCAAGA ACAATGGCGA TGAAGATCGC CATTTTTCTC AAAAACTCGG
 241 TGACTTAGCT GACAAATATG GTCCCGTCTT CACTTTCCGG TTAGGGTTTC GCCGTTTCTT
 301 GGCGGTGAGT AGTTATGAAG CTATGAAAGA ATGCTTCACT ACCAATGATA TCCATTTCGC
 361 CGATCGGCCA TCTTTACTCT ACGGAGAATA CCTTTGCTAT AATAACGCCA TGCTTGCTGT
 421 TGCCAAATAT GGCCCTTACT GGAAAAAAAA TCGAAAGTTA GTCAATCAAG AAGTTCTCTC
 481 CGTTAGTCGG CTCGAAAAAT TCAAACATGT TAGATTTTCT ATAATTCAGA AAAATATTAA
 541 ACAATTGTAT AATTGTGATT CACCAATGGT GAAGATAAAC CTTAGTGATT GGATAGATAA
 601 ATTGACATTC GACATCATTT TGAAAATGGT TGTTGGGAAG AACTATAATA ATGGACATGG
 661 AGAAATACTC AAAGTTGCTT TTCAGAAATT CATGGTTCAA GCTATGGAGA TGGAGCTCTA
 721 TGATGTTTTT CACATTCCAT TTTTCAAGTG GTTGGATCTT ACAGGGAATA TTAAGGCTAT
 781 GAAACAAACT TTCAAAGACA TTGATAATAT TATCCAAGGT TGGTTAGATG AGCACATTAA
 841 GAAGAGAGAA ACAAAGGATG TTGGAGGTGA AAACGAACAA GATTTTATAG ATGTGGTGCT
 901 TTCCAAGATG AGCGACGAAC ATCTTGGCGA GGGTTACTCT CATGACACAA CCATCAAAGC
 961 AACTGTATTC ACTTTGGTCT TGGATGCAAC AGACACACTT GCACTTCATA TAAAGTGGGT
1021 AATGGCGTTA ATGATAAACA ATAAGCATGT CATGAAGAAA GCACAAGAAG AGATGGACAC
1081 AATTGTTGGT AGAGATAGAT GGGTAGAAGA GAGTGATATC AAGAATTTGG TGTATCTCCA
1141 AGCAATTGTC AAAGAAGTAT TACGATTACA TCCACCCGCA CCTTTGTCAG TGCAACACCT
1201 ATCTGTAGAA GATTGTGTTG TCAATGGGTA CCATATTCCT AAGGGGACTG CACTACTTAC
1261 CAATATTATG AAACTACAGC GAGATCCTCA AACATGGCCA AATCCTGATA AATTCGATCC
1321 AGAGAGATTC CTGACGACTC ATGCTACTAT TGACTACCGC GGGCAGCACT ATGAGTCGAT
1381 CCCCTTTGGT ACGGGGAGAC GAGCTTGTCC CGCGATGAAT TATTCATTGC AAGTGGAACA
1441 CCTTTCAATT GCTCATATGA TCCAAGGTTT CAGTTTTGCA ACTACGACCA ATGAGCCTTT
1501 GGATATGAAA CAAGGTGTGG GTTTAACTTT ACCAAAGAAG ACTGATGTTG AAGTGCTAAT
1561 TACACCTCGC CTTCCTCCTA CGCTTTATCA ATATTAAGAT GTTTTGTTGT CGGGATTCGT
1621 TCTGATCAAT CCCTCAATG
```

SEQ. ID. NO. 226

```
   1 MVYLLSPIEA IVGFVTFSFL FYFLWTKKQS KILNPLPPKI PGGWPVIGHL FYFKNNGDED
  61 RHFSQKLGDL ADKYGPVFTF RLGFRRFLAV SSYEAMKECF TTNDIHFADR PSLLYGEYLC
 121 YNNAMLAVAK YGPYWKKNRK LVNQEVLSVS RLEKFKHVRF SIIQKNIKQL YNCDSPMVKI
 181 NLSDWIDKLT FDIILKMVVG KNYNNGHGEI LKVAFQKFMV QAMEMELYDV FHIPFFKWLD
 241 LTGNIKAMKQ TFKDIDNIIQ GWLDEHIKKR ETKDVGGENE QDFIDVVLSK MSDEHLGEGY
 301 SHDTTIKATV FTLVLDATDT LALHIKWVMA LMINNKHVMK KAQEEMDTIV GRDRWVEESD
 361 IKNLVYLQAI VKEVLRLHPP APLSVQHLSV EDCVVNGYHI PKGTALLTNI MKLQRDPQTW
 421 PNPDKFDPER FLTTHATIDY RGQHYESIPF GTGRRACPAM NYSLQVEHLS IAHMIQGFSF
 481 ATTTNEPLDM KQGVGLTLPK KTDVEVLITP RLPPTLYQY
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FIG. 114

```
NAME          D125-AF11
ORGANISM      NICOTIANA TABACUM
SEQ. ID. NO. 227
   1 CTTTTTCTCC CCAAAAAAGA GCTCATTTCC CTTGTCCCCA AAAATGGATC TTCTCTTACT
  61 AGAGAAGACC TTAATTGGTC TCTTCTTTGC CATTTTAATC GCTATAATTG TCTCTAGACT
 121 TCGTTCAAAG CGTTTTAAGC TTCCCCCAGG ACCAATCCCA GTACCAGTTT TTGGTAATTG
 181 GCTTCAAGTT GGTGATGATT TAAACCACAG AAATCTTACT GATTTTGCCA AAAAATTTGG
 241 TGATCTTTTC TTGTTAAGAA TGGGCCAGCG TAATTTAGTT GTTGTGTCAT CTCCTGAATT
 301 AGCTAAAGAA GTTTTACACA CACAAGGTGT TGAATTTGGT TCAAGAACAA GAAATGTTGT
 361 ATTTGATATT TTTACTGGAA AAGGTCAAGA TATGGTTTTT ACTGTATATG GTGAACACTG
 421 GAGAAAAATG AGGAGAATTA TGACTGTACC ATTTTTTACT AATAAAGTTG TGCAGCAATA
 481 TAGAGGGGGG TGGGAGTTTG AAGTGGCAAG TGTAATTGAG GATGTGAAGA AAAATCCTGA
 541 ATCTGCTACT AATGGGATTG TATTAAGGAG GAGATTACAA TTGATGATGT ATAATAATAT
 601 GTTTAGGATT ATGTTTGATA GGAGATTTGA GAGTGAAGAT GATCCTTTGT TTGTTAAGCT
 661 TAAGGCTTTG AATGGTGAAA GGAGTAGATT GGCTCAGAGT TTTGAGTATA ATTATGGTGA
 721 TTTTATTCCC ATTTTGAGGC CTTTTTTGAG AGGTTATTTG AAGATCTGTA AAGAAGTTAA
 781 GGAGAAGAGG CTGCAGCTTT TCAAAGATTA CTTTGTTGAT GAAAGAAAGA AGCTTTCAAA
 841 TACCAAGAGC TTGGACAGCA ATGCTCTGAA ATGTGCGATT GATCACATTC TTGAGGCTCA
 901 ACAGAAGGGG GAGATCAATG AGGACAACGT TCTTTACATT GTTGAAAACA TCAATGTTGC
 961 TGCTATAGAA ACCACATTAT GGTCAATTGA GTGGGGTATC GCCGAGTTAG TCAACCACCC
1021 TCACATCCAA AAGAAACTCC GCGACGAGAT TGACACAGTT CTTGGCCCAG GAGTGCAAGT
1081 GACTGAACCA GACACCCACA AGCTTCCATA CCTTCAGGCT GTGATCAAGG AGACGCTTCG
1141 TCTCCGTATG GCAATTCCTC TATTAGTCCC ACACATGAAC CTTCACGATG CAAAGCTTGG
1201 CGGGTTTGAT ATTCCAGCAG AGAGCAAAAT CTTGGTTAAC GCTTGGTGGC TAGCTAACAA
1261 CCCGGCTCAT TGGAAGAAAC CCGAAGAGTT CAGACCCGAG AGGTTCTTCG AAGAGGAGAA
1321 GCACGTTGAG GCCAATGGCA ATGACTTCAG ATATCTTCCG TTTGGCGTTG GTAGGAGGAG
1381 TTGCCCTGGA ATTATACTTG CATTGCCAAT TCTTGGCATT ACTTTGGGAC GTTTGGTTCA
1441 GAACTTTGAG CTGTTGCCTC CTCCAGGCCA GTCGAAGCTC GACACCACAG AGAAAGGTGG
1501 ACAGTTCAGT CTCCATATTT TGAAGCATTC CACCATTGTG TTGAAACCAA GGTCTTGCTG
1561 AACTTTCTGA TCCTAATCAA TTAAGGGGTT GAAGAAATTT TATAATTATG

SEQ. ID. NO. 228
   1 MDLLLLEKTL IGLFFAILIA IIVSRLRSKR FKLPPGPIPV PVFGNWLQVG DDLNHRNLTD
  61 FAKKFGDLFL LRMGQRNLVV VSSPELAKEV LHTQGVEFGS RTRNVVFDIF TGKGQDMVFT
 121 VYGEHWRKMR RIMTVPFFTN KVVQQYRGGW EFEVASVIED VKKNPESATN GIVLRRRLQL
 181 MMYNNMFRIM FDRRFESEDD PLFVKLKALN GERSRLAQSF EYNYGDFIPI LRPFLRGYLK
 241 ICKEVKEKRL QLFKDYFVDE RKKLSNTKSL DSNALKCAID HILEAQQKGE INEDNVLYIV
 301 ENINVAAIET TLWSIEWGIA ELVNHPHIQK KLRDEIDTVL GPGVQVTEPD THKLPYLQAV
 361 IKETLRLRMA IPLLVPHMNL HDAKLGGFDI PAESKILVNA WWLANNPAHW KKPEEFRPER
 421 FFEEEKHVEA NGNDFRYLPF GVGRRSCPGI ILALPILGIT LGRLVQNFEL LPPPGQSKLD
 481 TTEKGGQFSL HILKHSTIVL KPRSC
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FIG. 115

NAME D134-AE11
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 229

```
   1 AACAATAAAA ATGGAGACAT TATTTAACAT CAAAGTTGCA GTTTCATTAG TAATTGTGAT
  61 AATTTTTCTG AGATGGGTAT GGAAATTCTT GAATTGGGTG TGGATTCAAC CAAAGAAAAT
 121 GGAAAAAAGA CTAAAAATGG AAGGTTTCAA AGGAAGCTCA TATAAGCTAT TATTTGGAGA
 181 TATGAAAGAA ATAAATACAA TGGTTGAAGA AGCCAAAACC AAGCCTATGA ATTTTACCAA
 241 TGATTATGTG GCTAGAGTCT TGCCTCACTT CACAAAGTTG ATGCTCCAAT ATGGCAAGAA
 301 TAGCTTTATG TGGTTAGGGC CAAAACCAAC AATGTTTATC ACAGACCCTG AACTAATAAG
 361 GGAGATCTTG TCAAAAAGTT ACATATACCA GGAGATTCAA GGCAATCCAA TCACTAAGTT
 421 GCTAGCACAA GGACTAGTAA GTTATGAAGC AGAGAAATGG GCTAAGCATA GAAAAATTAT
 481 CAATCCTGCA TTTCACCTTG ACAAGTTGAA GCATATGCTA CCATCATTCT ACTTGAGTTG
 541 TTGTGACATG CTCAGAAAAT GGGAAAGTAT AGCTTCATCA GAGGGATCAG AAATAGACGT
 601 GTGGCCTTTT CTGGAAACGT TGACAAGCGA TGCTATTTCA AGAACAGCTT TTGGTAGTAA
 661 CTATGAAGAC GGGAGACAGA TATTTGAGCT TCAAAAAGAA CAAGCTGAGT TGATTTTACA
 721 AGCAGCGCGA TGGCTTTACA TCCCCGGATG GAGGTTTGTG CCAACAAAGA GGAACAAGAG
 781 GATGAAGCAA ATCGCTAAAG AAGTACGATC ATTAGTGTTG GGAATAATCA ATAAGAGAAT
 841 AAGGGAAATG AAAGCAGGGG AAGCTGCAAA AGATGACTTA CTGGGAATAC TATTGGAATC
 901 TAATTTCAAA GAAATCCAAA TGCACGGAAA CAAGAACTTT GGCATGACTA TCGACGAAGT
 961 GATTGAAGAG TGCAAGTTAT TTTACTTTGC TGGGCAAGAA ACTACTTCAG TTTTGCTTGT
1021 TTGGACTTTG ATTTTACTGA GTAAGCATGT CGATTGGCAA GAAAGAGCTA GAGAAGAAGT
1081 TCATCAAGTC TTTGGAAGTA ACAAACCTGA TTATGACGCA TTGAATCAGT TGAAAGTTGT
1141 AACGATGATA TTCAACGAGG TTTTAAGGTT GTACCCACCG GGAATTACCA TAAGTCGAAC
1201 TGTACACGAG GATACCAAAT TAGGGAACTT GTCATTGCCA GCAGGGATAC AGCTTGTGTT
1261 ACCTGCAATT TGGTTGCATC ATGACAATGA AATATGGGGA GATGATGCAA AGGAGTTCAA
1321 ACCAGAGAGG TTTAGTGAAG GAGTTAATAA AGCAACAAAG GGTAAATTTG CATATTTTCC
1381 ATTTAGTTGG GGACCAAGAA TATGTGTTGG ACTGAATTTT GCAATGTTAG AGGCAAAAAT
1441 GGCACTTGCA TTGATTCTAC AACACTATGC TTTTGAGCTC TCTCCATCTT ATGCACATGC
1501 TCCTCATACA ATTATCACTC TGCAACCTCA ACATGGTGCT CCTTTGATTT TGCGCAAGCT
1561 GTAGCGCGGA TATATTGATT GGTTATCTAC TGTAG
```

SEQ. ID. NO. 230

```
   1 METLFNIKVA VSLVIVIIFL RWVWKFLNWV WIQPKKMEKR LKMEGFKGSS YKLLFGDMKE
  61 INTMVEEAKT KPMNFTNDYV ARVLPHFTKL MLQYGKNSFM WLGPKPTMFI TDPELIREIL
 121 SKSYIYQEIQ GNPITKLLAQ GLVSYEAEKW AKHRKIINPA FHLDKLKHML PSFYLSCCDM
 181 LRKWESIASS EGSEIDVWPF LETLTSDAIS RTAFGSNYED GRQIFELQKE QAELILQAAR
 241 WLYIPGWRFV PTKRNKRMKQ IAKEVRSLVL GIINKRIREM KAGEAAKDDL LGILLESNFK
 301 EIQMHGNKNF GMTIDEVIEE CKLFYFAGQE TTSVLLVWTL ILLSKHVDWQ ERAREEVHQV
 361 FGSNKPDYDA LNQLKVVTMI FNEVLRLYPP GITISRTVHE DTKLGNLSLP AGIQLVLPAI
 421 WLHHDNEIWG DDAKEFKPER FSEGVNKATK GKFAYFPFSW GPRICVGLNF AMLEAKMALA
 481 LILQHYAFEL SPSYAHAPHT IITLQPQHGA PLILRKL
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FIG. 116

NAME D209-AH12
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 231

```
   1 ATATGCAACT GAGATTTGAA GAATACCAAC TAACCAAAAT GCAGTTCTTC AGCTTGGTTT
  61 CCATTTTCCT ATTTCTATCT TTCCTCTTTT TGTTAAGGAT ATGGAAGAAC TCCAATAGCC
 121 AAAGCAAAAA GTTGCCACCA GGTCCATGGA AACTACCAAT ACTAGGAAGT ATGCTTCATA
 181 TGGTTGGTGG ACTACCACAC CATGTCCTTA GAGATTTAGC CAAAAAATAT GGACCACTTA
 241 TGCACCTTCA ATTAGGTGAA GTTTCTGCGG TTGTGGTTAC TTCTCCTGAT ACGGCAAAAG
 301 AAGTATTAAA AACTCATGAC ATCGCTTTTG CGTCTAGGCC TAGCCTTTTG GCCCCGGAGA
 361 TTGTCTGTTA CAATAGGTCT GATCTAGCCT TTTGCCCCTA TGGCGACTAT TGGAGACAAA
 421 TGCGTAAAAT ATGTGTCTTG GAAGTGCTCA GTGCCAAGAA TGTTCGGACA TTTAGCTCTA
 481 TTAGGCGGAA TGAAGTTCTT CGTCTCATTA ATTTTATCCG GTCATCTTCT GGTGAACCTA
 541 TTAATGTTAC GGAAAGGATC TTTTTGTTCA CAAGCTCCAT GACATGTAGA TCAGCGTTTG
 601 GGCAAGTGTT CAAAGAGCAA GACAAATTTA TACAACTAAT TAAAGAAGTG ATACTCTTAG
 661 CAGGAGGGTT TGATGTGGCT GACATATTCC CTTCACTGAA GTTTCTTCAT GTGCTCAGTG
 721 GAATGAAGGG TAAGATTATG AATGCACACC ATAAGGTAGA TGCCATTGTT GAGAATGTCA
 781 TCAATGAGCA CAAGAAAAAT CTTGCAATTG GGAAAACTAA TGGAGCGTTA GGAGGTGAAG
 841 ATTTAATTGA TGTTCTTCTA AGACTTATGA ATGATGGAGG CCTTCAATTT CCTATCACCA
 901 ACGACAACAT CAAAGCCATA ATTTTTGACA TGTTTGCTGC CGGGACAGAG ACTTCATCGT
 961 CAACAATTGT GTGGGCTATG GTAGAAATGG TGAAAAATCC AGCCGTATTC GCGAAAGCTC
1021 AAGCAGAAGT AAGAGAAGCA TTTAGAGGAA AAGAAACTTT CGATGAAAAT GATGTGGAGG
1081 AGCTAAACTA CCTAAAGTTA GTAATAAAAG AAACTCTAAG ACTTCATCCA CCGGTTCCAC
1141 TTTTGCTCCC AAGAGAATGT AGGGAAGAGA CAAATATAAA CGGCTACACT ATTCCTGTAA
1201 AGACCAAAGT CATGGTTAAT GTTTGGGCTT TGGGAAGAGA TCCAAAATAT TGGAATGACG
1261 CAGAAACTTT TATGCCAGAG AGATTTGAGC AGTGCTCTAA GGATTTTGTT GGTAATAATT
1321 TTGAATATCT TCCATTTGGT GGCGGAAGGA GGATTTGTCC TGGGATTTCG TTTGGCTTAG
1381 CTAATGCTTA TTTGCCATTG GCTCAATTAC TATATCACTT CGATTGGAAA CTCCCTGCTG
1441 GAATCGAACC AAGCGACTTG GACTTGACTG AGTTGGTTGG AGTAACTGCC GCTAGAAAAA
1501 GTGACCTTTA CTTGGTTGCG ACTCCTTATC AACCTCCTCA AAAGTGATTT AATGGTTTCA
1561 AGTTTTTATT TCCTAGCAAA CCCCACTATT GTCCTATCTT TCTTTTGGTG TTTTCGGTTT
1621 TATCTACTCT AATACATGCA TCTTTTACCA TATAGGAATG TACCATGTTG TCG
```

SEQ. ID. NO. 232

```
  1 MQLRFEEYQL TKMQFFSLVS IFLFLSFLFL LRIWKNSNSQ SKKLPPGPWK LPILGSMLHM
 61 VGGLPHHVLR DLAKKYGPLM HLQLGEVSAV VVTSPDTAKE VLKTHDIAFA SRPSLLAPEI
121 VCYNRSDLAF CPYGDYWRQM RKICVLEVLS AKNVRTFSSI RRNEVLRLIN FIRSSSGEPI
181 NVTERIFLFT SSMTCRSAFG QVFKEQDKFI QLIKEVILLA GGFDVADIFP SLKFLHVLSG
241 MKGKIMNAHH KVDAIVENVI NEHKKNLAIG KTNGALGGED LIDVLLRLMN DGGLQFPITN
301 DNIKAIIFDM FAAGTETSSS TIVWAMVEMV KNPAVFAKAQ AEVREAFRGK ETFDENDVEE
361 LNYLKLVIKE TLRLHPPVPL LLPRECREET NINGYTIPVK TKVMVNVWAL GRDPKYWNDA
421 ETFMPERFEQ CSKDFVGNNF EYLPFGGGRR ICPGISFGLA NAYLPLAQLL YHFDWKLPAG
481 IEPSDLDLTE LVGVTAARKS DLYLVATPYQ PPQK
```

FIG. 117

```
NAME        D221-BB8
ORGANISM    NICOTIANA TABACUM
SEQ. ID. NO. 233
   1 GAATTATTTC ACGTGTTGTA TTCCTTGTCT ATGATAGGAA GCTCGTTACC TCAGCGTACA
  61 AACCCCAAAT AAAAAATGAA TTTCCTTGTG GTGTTAGCTT CTCTCTTTCT CTTTGTGTTC
 121 CTAATGAGGA TAAGCAAAGC AAAAAAGCTC CCTCCAGGTC CAAGGAAACT GCCTATAATA
 181 GGAAACCTTC ATCAAATTGG AAAATTACCT CATCGTTCAC TTCAAAAACT TTCTAATGAA
 241 TATGGGGATT TCATTTTCTT GCAATTAGGT TCTGTACCGA CTGTGGTTGT CTCCTCAGCT
 301 GACATTGCCC GAGAGATCTT TAGAACTCAC GACCTTGTTT TCTCAGGCCG TCCTGCTTTA
 361 TATGCTGCCA GAAAACTTTC CTACAATTGC TACAACGTTT CATTTGCACC CTATGGTAAT
 421 TACTGGAGAG AGGCTCGGAA AATTCTAGTG TTGGAGTTGC TAAGTACAAA GAGAGTACAA
 481 AGTTTCGAGG CAATTCGAGA CGAGGAAGTA AGTAGCTTGG TTCAAATTAT CTGTAGTTCC
 541 TTGAGCTCAC CTGTTAACAT AAGCACATTA GCACTATCCT TGGCAAATAA CGTTGTTTGT
 601 CGAGTGGCTT TTGGGAAAGG GAGTGCTGAA GGAGGAAATG ATTATGAGGA TAGGAAGTTT
 661 AATGAAATTC TATATGAGAC ACAAGAATTA TTGGGTGAGT TTAACGTTGC TGATTATTTT
 721 CCTCGGATGG CATGGATTAA CAAAATAAAT GGGTTTGATG AACGATTGGA AAATAATTTT
 781 AGGGAATTGG ATAAGTTTTA TGACAAAGTA ATAGAAGATC ATCTTAATTC ATGTAGCTGG
 841 ATGAAACAAA GGGATGATGA AGACGTTATT GATGTATTGC TTCGAATTCA AAAGGATCCA
 901 AGCCAAGAAA TTCCTCTCAA AGATGATCAC ATTAAGGGCC TTCTTGCGGA TATATTCATA
 961 GCTGGAACTG ATACATCATC AACAACCATA GAATGGGCAA TGTCAGAACT CATAAAAAAT
1021 CCAAGAGTCT TGAGAAAAGC TCAAGAGGAA GTTAGAGAAG TTTCTAAGGG AAAACAAAAG
1081 GTCCAAGAAA GTGATCTTTG CAAACTAGAT TACTTGAAAT TGGTCATCAA AGAAACCTTT
1141 AGACTACACC CACCAGTCCC ATTACTAGTC CCTCGAGTAA CAACAGCCAG CTGCAAAATA
1201 ATGGAATACG AAATTCCAGT AAATACAAGA GTCTTCATCA ACGCGACAGC AAATGGGACA
1261 AATCCAAAAT ACTGGGAAAA TCCATTGACA TTCTTGCCAG AGAGATTCTT GGATAAGGAG
1321 ATTGATTACA GAGGCAAAAA TTTTGAGTTG TTGCCATTTG GGGCAGGGAG AAGAGGGTGT
1381 CCAGGAATTA ATTTTTCAAT ACCACTTGTT GAGCTTGCAC TTGCTAATCT ATTGTTTCAT
1441 TATAATTGGT CACTTCCTGA AGGGATGCTA GCTAAGGATG TTGATATGGA AGAAGCTTTG
1501 GGGATTACCA TGCACAAGAA ATCTCCCCTT TGCTTAGTAG CTTCTCATTA TACTTGTTGA
1561 GATTTTAAAA GATTTTAGCA TAGCTATATA TAGCTTGAAG T

SEQ. ID. NO. 234
   1 MNFLVVLASL FLFVFLMRIS KAKKLPPGPR KLPIIGNLHQ IGKLPHRSLQ KLSNEYGDFI
  61 FLQLGSVPTV VVSSADIARE IFRTHDLVFS GRPALYAARK LSYNCYNVSF APYGNYWREA
 121 RKILVLELLS TKRVQSFEAI RDEEVSSLVQ IICSSLSSPV NISTLALSLA NNVVCRVAFG
 181 KGSAEGGNDY EDRKFNEILY ETQELLGEFN VADYFPRMAW INKINGFDER LENNFRELDK
 241 FYDKVIEDHL NSCSWMKQRD DEDVIDVLLR IQKDPSQEIP LKDDHIKGLL ADIFIAGTDT
 301 SSTTIEWAMS ELIKNPRVLR KAQEEVREVS KGKQKVQESD LCKLDYLKLV IKETFRLHPP
 361 VPLLVPRVTT ASCKIMEYEI PVNTRVFINA TANGTNPKYW ENPLTFLPER FLDKEIDYRG
 421 KNFELLPFGA GRRGCPGINF SIPLVELALA NLLFHYNWSL PEGMLAKDVD MEEALGITMH
 481 KKSPLCLVAS HYTC
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FIG. 118

NAME D222-BH4
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 235

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   1 CAAAGACTAA AAGATGTCGG TCTTTGCGGT TATTTCATTC TTTCTACTTC TGTTTTTTCT
  61 TTTCAAATCA TATTTGCCCT CATCGAAAAC AAAGAAAAAT TCTCCACCAT CTCCTTCAAA
 121 GCTTCCGTTA ATCGGTCACT TCCACAAACT AGGCTTACAA CCTCACCGTT CTCTACAAAA
 181 ACTATCAAAT GAACATGGTC CCATGATGAT GCTTCAATTC GGTAGCGTAC CTGTGCTTAT
 241 CGCTTCATCA GCTGAAGCTG CTTCCGAAAT CATGAAAACC CAAGATTTGT CTTTTGCAAA
 301 CAAACCCATT TCAACCATTC CTAGCAAGCT TTTCTTCGGC CCAAAGGACG TTGCCTTCAC
 361 CCCATATGGG GATTACTGGA GGAATGCCAG AAGCATTTGC ATGCTTCAGC TTTTGAACAA
 421 CAAAAGAGTC CAGTCTTTTC GAAAGATAAG GGAAGAAGAG ACTTCTCTTC TTCTCCAGAG
 481 GATTAGGGAA TCGCCAAATT CAGAAGTCGA TTTAACGGAG CTGTTCGTTT CCATGACTAA
 541 CGACATAGTT TGCAGGGTGG CCTTAGGAAG GAAGTATTGT GATGGGGAAG AAGGGAGGAA
 601 ATTCAAGTCT TTGCTGTTAG AGTTTGTGGA ATTGTTGGGA GTTTTTAACA TTGGAGATTA
 661 CATGCCGTGG CTTGCATGGA TGAATCGTTT CAATGGTTTG AATGCCAAAG TGGATAAAGT
 721 GGCGAAAGAG TTTGATGCAT TTTTGGAGGA TGTGATTGAG GAACACGGAG GAAATAAGAA
 781 ATCAGACACT GAAGCTGAAG GGGCAGACTT CGTGGATATA TTATTGCAGG TTCACAAAGA
 841 AAACAAGGCT GGTTTTCAAG TCGAAATGGA TGCAATCAAA GCTATTATCA TGGATATGTT
 901 TGCTGCGGGA ACAGATACAA CTTCCACGCT TCTAGAGTGG ACAATGAACG AGCTCTTAAG
 961 AAATCCAAAA ACATTGAATA AGTTGAGAGA TGAGGTGAGA CAAGTGACTC AAGGGAAGAC
1021 AGAGGTAACA GAGGATGACT TAGAGAAAAT GCCGTATTTA AGAGCAGCAG TTAAGGAGAG
1081 TTCCAGGCTA CACTCTCCAG TGCCACTTCT ACCTCGAGAA GCAATTAAGG ATGCAAAGGT
1141 TTTGGGCTAC GATATAGCTG CAGGGACTCA AGTCCTCGTT TGTCCATGGG CAATCTCAAG
1201 AGATCCAAAC CTTTGGGAAA ATCCAGAGGA GTTTCAACCT GAAAGATTCT TGGATACTTC
1261 CATAGATTAC AAAGGCTTAC ATTTCGAGTT AATTCCATTC GGTGCAGGTC GGAGGGGTTG
1321 CCCTGGCATC ACATTTGCTA AGTTTGTGAA TGAGCTAGCA TTGGCAAGAT TAATGTTCCA
1381 TTTTGATTTC TCGCTACCAA AAGGAGTTAA GCATGAGGAT TTGGACGTGG AGGAAGCTGC
1441 TGGAATTACT GTTAGAAGGA AGTTCCCCCT TTTAGCCGTC GCCACTCCAT GCTCGTGATT
1501 TTTATTTTAG AGCTCATTCT ATGCCTTAAA AACTACTACT AGATAACTGC GTAGTAAATA
1561 ATGCTTGGTA
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SEQ. ID. NO. 236

```
   1 MSVFAVISFF LLLFFLFKSY LPSSKTKKNS PPSPSKLPLI GHFHKLGLQP HRSLQKLSNE
  61 HGPMMMLQFG SVPVLIASSA EAASEIMKTQ DLSFANKPIS TIPSKLFFGP KDVAFTPYGD
 121 YWRNARSICM LQLLNNKRVQ SFRKIREEET SLLLQRIRES PNSEVDLTEL FVSMTNDIVC
 181 RVALGRKYCD GEEGRKFKSL LLEFVELLGV FNIGDYMPWL AWMNRFNGLN AKVDKVAKEF
 241 DAFLEDVIEE HGGNKKSDTE AEGADFVDIL LQVHKENKAG FQVEMDAIKA IIMDMFAAGT
 301 DTTSTLLEWT MNELLRNPKT LNKLRDEVRQ VTQGKTEVTE DDLEKMPYLR AAVKESSRLH
 361 SPVPLLPREA IKDAKVLGYD IAAGTQVLVC PWAISRDPNL WENPEEFQPE RFLDTSIDYK
 421 GLHFELIPFG AGRRGCPGIT FAKFVNELAL ARLMFHFDFS LPKGVKHEDL DVEEAAGITV
 481 RRKFPLLAVA TPCS
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FIG. 119

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NAME          D224-AF10
ORGANISM      NICOTIANA TABACUM
SEQ. ID. NO. 237
      1 ATTATCCATC ACCTAAAATG GAGAATTCTT GGGTTTTTCT AGCCTTGGCA GGGCTATCTG
     61 CATTAGCTTT TCTCTGTAAA ATAATCACCT GTCGAAGACC GGTTAACCGG AAAATACCAC
    121 CAGGTCCAAA ACCATGGCCC ATCATTGGCA ATTTGAACCT ACTTGGTCCT ATACCACATC
    181 AATCTTTTGA CTTGCTTTCC AAAAAATATG GAGAGTTGAT GCTGCTGAAA TTTGGCTCCA
    241 GGCCAGTTCT TGTTGCTTCA TCTGCTGAAA TGGCAAAACA GTTTTTAAAA GTACATGATG
    301 CTAATTTCGC CTCCCGTCCT ATGCTAGCTG GTGGAAAGTA TACAAGCTAT AACTATTGTG
    361 ACATGACATG GGCACCCTAT GGTCCCTATT GGCGCCAAGC ACGACGAATT TACCTTAACC
    421 AGATATTTAC TCCGAAAAGG CTAGACTCGT TCGAGTACAT TCGTGTTGAA GAAAGGCAGG
    481 CCTTGATTTC CCAGCTGAAT TCCCTTGCTG GAAAGCCATT TTTTCTCAAA GACCATTTGT
    541 CGCGATTTAG CCTCTGCAGC ATGACAAGGA TGGTTTTGAG CAACAAGTAC TTTGGTGAAT
    601 CAACAGTTAG AGTAGAAGAT TTGCAGTACC TGGTAGATCA ATGGTTCTTA CTTAATGGTG
    661 CTTTCAACAT TGGAGATTGG ATTCCATGGC TCAGCTTCTT GGACCTACAA GGCTATGTGA
    721 AACAAATGAA GGCTTTGAAA AGAACTTTTG ATAAGTTCCA CAACATTGTG CTAGATGATC
    781 GCAGGGCTAA GAAGAATGCA GAGAAGAACT TTGTCCCAAA AGACATGGTT GATGTCTTGT
    841 TGAAGATGGC TGAAGATCCT AATCTGGAAG TCAAACTCAC TAATGACTGT GTCAAAGGGT
    901 TAATGCAGGA TTTACTAACT GGAGGAACAG ATAGCTTAAC AGCAGCAGTG CAATGGGCAT
    961 TTCAAGAACT TCTTAGACGG CCAAGGGTTA TTGAGAAGGC AACCGAAGAG CTTGACCGGA
   1021 TTGTCGGGAA AGAGAGATGG GTAGAAGAGA AAGATTGCTC GCAGCTATCT TACGTTGAAG
   1081 CAATCCTCAA GGAAACACTA AGGTTACATC CTCTAGGAAC TATGCTAGCA CCGCATTGTG
   1141 CTATAGAAGA TTGTAACGTG GCTGGTTATG ACATACAGAA AGGAACGACC GTTCTGGTGA
   1201 ATGTTTGGAC CATTGGAAGG GACCCAAAAT ACTGGGATAG AGCACAAGAG TTTCTCCCCG
   1261 AGAGATTCTT AGAGAACGAC ATTGATATGG ACGGACATAA CTTTGCTTTC TTGCCATTTG
   1321 GCTCGGGGCG AAGGAGGTGC CCTGGCTATA GCCTTGGACT TAAGGTTATC CGAGTAACAT
   1381 TAGCCAACAT GTTGCATGGA TTCAACTGGA AATTACCTGA AGGTATGAAG CCAGAAGATA
   1441 TAAGTGTGGA AGAACATTAT GGGCTCACTA CACATCCTAA GTTTCCTGTT CCTGTGATCT
   1501 TGGAATCTAG ACTTTCTTCA GATCTCTATT CCCCCATCAC TTAATCCTAA GTGCTTCCTA
   1561 TTATAGCATC ATATCAATAT CCCTC

SEQ. ID. NO. 238
      1 MENSWVFLAL AGLSALAFLC KIITCRRPVN RKIPPGPKPW PIIGNLNLLG PIPHQSFDLL
     61 SKKYGELMLL KFGSRPVLVA SSAEMAKQFL KVHDANFASR PMLAGGKYTS YNYCDMTWAP
    121 YGPYWRQARR IYLNQIFTPK RLDSFEYIRV EERQALISQL NSLAGKPFFL KDHLSRFSLC
    181 SMTRMVLSNK YFGESTVRVE DLQYLVDQWF LLNGAFNIGD WIPWLSFLDL QGYVKQMKAL
    241 KRTFDKFHNI VLDDRRAKKN AEKNFVPKDM VDVLLKMAED PNLEVKLTND CVKGLMQDLL
    301 TGGTDSLTAA VQWAFQELLR RPRVIEKATE ELDRIVGKER WVEEKDCSQL SYVEAILKET
    361 LRLHPLGTML APHCAIEDCN VAGYDIQKGT TVLVNVWTIG RDPKYWDRAQ EFLPERFLEN
    421 DIDMDGHNFA FLPFGSGRRR CPGYSLGLKV IRVTLANMLH GFNWKLPEGM KPEDISVEEH
    481 YGLTTHPKFP VPVILESRLS SDLYSPIT
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FIG. 120

NAME D224-BD11
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 239

```
   1 CTCATTATCC ATCACCTAAA ATGGAGAATT CTTGGGTTTT TCTAGCCTTG GCAGGGCTAT
  61 CTGCATTAGC TTTTCTCTGT AAAATAATCA CCTGTCGAAG ACCGGTTAAC CGGAAAATAC
 121 CACCAGGTCC AAAACCATGG CCCATCATTG GCAATTTGAA CCTACTTGGT CCTATACCAC
 181 ATCAATCTTT TGACTTGCTT TCCAAAAAAT ATGGAGAGTT GATGCTGCTG AAATTTGGCT
 241 CCAGGCCAGT TCTTGTTGCT TCATCTGCTG AAATGGCAAA ACAGTTTTTA AAAGTACATG
 301 ATGCTAATTT CGCCTCCCGT CCTATGCTAG CTGGTGGAAA GTATACAAGC TATAACTATT
 361 GTGACATGAC ATGGGCACCC TATGGTCCCT ATTGGCGCCA AGCACGACGA CGAATTTACC
 421 TTAACCAGAT ATTTACTCCG AAAAGGCTAG ACTCGTTCGA GTACATTCGT GTTGAAGAAA
 481 GGCAGGCCTT GATTTCCCAG CTGAATTCCC TTGCTGGAAA GCCATTTTTT CTCAAAGACC
 541 ATTTGTCGCG ATTTAGCCTC TGCAGCATGA CAAGGATGGT TTTGAGCAAC AAGTATTTTG
 601 GTGAATCAAC AGTTAGAGTA GAAGATTTGC AGTACCTGGT AGATCAATGG TTCTTACTTA
 661 ATGGTGCTTT CAACATTGGA GATTGGATTC CATGGCTCAG CTTCTTGGAC CTACAAGGCT
 721 ATGTGAAACA AATGAAGGCT TTGAAAAGAA CTTTTGATAA GTTCCACAAC ATTGTGCTAG
 781 ATGATCACAG GGCTAAGAAG AATGCAGAGA AGAACTTTGT CCCAAAAGAC ATGGTTGATG
 841 TCTTGTTGAA GATGGCTGAA GATCCTAATC TGGAAGTCAA ACTCACTAAT GACTGTGTCA
 901 AAGGGTTAAT GCAGGATTTA CTAACTGGAG GAACAGATAG CTTAACAGCA GCAGTGCAAT
 961 GGGCATTTCA AGAACTTCTT AGACAGCCAA GGGTTATTGA GAAGGCAACC GAAGAGCTTG
1021 ACCGGATTGT CGGGAAAGAG AGATGGGTAG AAGAGAAAGA TTGCTCGCAG CTATCTTACG
1081 TTGAAGCAAT CCTCAAGGAA ACACTAAGGT TACATCCTCT AGGAACTATG CTAGCACCGC
1141 ATTGTGCTAT AGAAGATTGT AACGTGGCTG GTTATGACAT ACAGAAAGGA ACGACCGTTC
1201 TGGTGAATGT TTGGACCATT GGAAGGGACC CAAAATACTG GGATAGAGCA CAAGAGTTTC
1261 TCCCCGAGAG ATTCTTAGAG AACGACATTG ATATGGACGG ACATAACTTT GCTTTCTTGC
1321 CATTTGGCTC GGGGCGAAGG AGGTGCCCTG GCTATAGCCT TGGACTTAAG GTTATCCGAG
1381 TAACATTAGC CAACATGTTG CATGGATTCA ACTGGAAATT ACCTGAAGGT ATGAAGCCAG
1441 AAGATATAAG TGTGGAAGAA CATTATGGGC TCACTACACA TCCTAAGTTT CCTGTTCCTG
1501 TGATCTTGGA ATCTAGACTT TCTTCAGATC TCTATTCCCC CATCACTTAA TCCTAAGTGC
1561 TTCCTATTAT AGCATCATAT CAATATCCCT C
```

SEQ. ID. NO. 240

```
   1 MENSWVFLAL AGLSALAFLC KIITCRRPVN RKIPPGPKPW PIIGNLNLLG PIPHQSFDLL
  61 SKKYGELMLL KFGSRPVLVA SSAEMAKQFL KVHDANFASR PMLAGGKYTS YNYCDMTWAP
 121 YGPYWRQARR RIYLNQIFTP KRLDSFEYIR VEERQALISQ LNSLAGKPFF LKDHLSRFSL
 181 CSMTRMVLSN KYFGESTVRV EDLQYLVDQW FLLNGAFNIG DWIPWLSFLD LQGYVKQMKA
 241 LKRTFDKFHN IVLDDHRAKK NAEKNFVPKD MVDVLLKMAE DPNLEVKLTN DCVKGLMQDL
 301 LTGGTDSLTA AVQWAFQELL RQPRVIEKAT EELDRIVGKE RWVEEKDCSQ LSYVEAILKE
 361 TLRLHPLGTM LAPHCAIEDC NVAGYDIQKG TTVLVNVWTI GRDPKYWDRA QEFLPERFLE
 421 NDIDMDGHNF AFLPFGSGRR RCPGYSLGLK VIRVTLANML HGFNWKLPEG MKPEDISVEE
 481 HYGLTTHPKF PVPVILESRL SSDLYSPIT
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FIG. 121

NAME D228-AD7
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 241

```
   1 TGATAATGCT CTTTCTACTC TTTGTAGCCC TTCCTTTCAT TCTTATTTTT CTTCTTCCTA
  61 AATTCAAAAA TGGTGGAAAT AACAGATTGC CACCAGGTCC TATAGGTTTA CCATTCATTG
 121 GAAATTTGCA TCAATACGAT AGTATAACTC CTCATATCTA TTTTTGGAAA CTTTCAAAAA
 181 AATATGGCAA AATCTTCTCA TTAAAACTTG CTTCTACTAA TGTGGTAGTA GTTTCTTCAG
 241 CAAAATTAGC AAAAGAAGTA TTGAAAAAAC AAGATTTAAT ATTTTGTAGT AGACCATCTA
 301 TTCTTGGCCA ACAAAAACTG TCTTATTATG GTCGTGATAT TGCTTTTAAT GATTATTGGA
 361 GAGAAATGAG AAAAATTTGT GTTCTTCATC TTTTTAGTTT AAAAAAAGTT CAATTATTTA
 421 GTCCAATTCG TGAAGATGAA GTTTTTAGAA TGATTAAGAA AATATCAAAA CAAGCTTCTA
 481 CTTCACAAAT TATTAATTTG AGTAATTTAA TGATTTCATT AACAAGTACA ATTATTTGTA
 541 GAGTTGCTTT TGGTGTTAGG ATTGAAGAAG AAGCACATGC AAGGAAGAGA TTTGATTTTC
 601 TTTTGGCCGA GGCACAAGAA ATGATGGCTA GTTTCTTTGT ATCTGATTTT TTTCCCTTTT
 661 TAAGTTGGAT TGATAAATTA AGTGGATTGA CATATAGACT TGAGAGGAAT TTCAAGGATT
 721 TGGATAATTT TTATGAAGAA CTCATTGAGC AACATCAAAA TCCTAATAAG CCAAAATATA
 781 TGGAAGGAGA TATTGTTGAT CTTTTGCTAC AATTGAAGAA AGAGAAATTA ACACCACTTG
 841 ATCTCACTAT GGAAGATATA AAAGGAATTC TCATGAATGT GTTAGTTGCA GGATCAGACA
 901 CTAGTGCAGC TGCTACTGTT TGGGCAATGA CAGCCTTGAT AAAGAATCCT AAAGCCATGG
 961 AAAAAGTTCA ATTAGAAATC AGAAAATCAG TTGGGAAGAA AGGCATTGTA AATGAAGAAG
1021 ATGTCCAAAA CATCCCTTAT TTTAAAGCAG TGATAAAGGA AATATTTAGA TTGTATCCAC
1081 CAGCTCCACT TTTAGTTCCA AGAGAATCAA TGGAAAAAAC CATATTAGAA GGTTATGAAA
1141 TTCGGCCAAG AACCATAGTT CATGTTAACG CTTGGGCTAT AGCAAGGGAT CCTGAAATAT
1201 GGGAAAATCC AGATGAATTT ATACCTGAGA GATTTTTGAA TAGCAGTATC GATTACAAGG
1261 GTCAAGATTT TGAGTTACTT CCATTTGGTG CAGGCAGAAG AGGTTGCCCA GGTATTGCAC
1321 TTGGGGTTGC ATCCATGGAA CTTGCTTTGT CAAATCTTCT TTATGCATTT GATTGGGAGT
1381 TGCCTTATGG AGTAAAAAAA GAAGACATCG ACACAAACGT TAGGCCTGGA ATTGCCATGC
1441 ACAAGAAAAA CGAACTTTGC CTTGTCCCAA AAAATTATTT ATAAATTATA TTGGGACGTG
1501 GATCTCATGC TAGTTCTGTG CGGTCAGCTA AGCTTATTAT TTTTGGCTCA AATTATGTAT
1561 ACATAATTAG TACATGTTTA AAATGTATAA ATATAGTAGA ACCATTCTCA TGGTT
```

SEQ. ID. NO. 242

```
   1 MLFLLFVALP FILIFLLPKF KNGGNNRLPP GPIGLPFIGN LHQYDSITPH IYFWKLSKKY
  61 GKIFSLKLAS TNVVVVSSAK LAKEVLKKQD LIFCSRPSIL GQQKLSYYGR DIAFNDYWRE
 121 MRKICVLHLF SLKKVQLFSP IREDEVFRMI KKISKQASTS QIINLSNLMI SLTSTIICRV
 181 AFGVRIEEEA HARKRFDFLL AEAQEMMASF FVSDFFPFLS WIDKLSGLTY RLERNFKDLD
 241 NFYEELIEQH QNPNKPKYME GDIVDLLLQL KKEKLTPLDL TMEDIKGILM NVLVAGSDTS
 301 AAATVWAMTA LIKNPKAMEK VQLEIRKSVG KKGIVNEEDV QNIPYFKAVI KEIFRLYPPA
 361 PLLVPRESME KTILEGYEIR PRTIVHVNAW AIARDPEIWE NPDEFIPERF LNSSIDYKGQ
 421 DFELLPFGAG RRGCPGIALG VASMELALSN LLYAFDWELP YGVKKEDIDT NVRPGIAMHK
 481 KNELCLVPKN YL
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FIG. 122

NAME D228-AH8
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 243

```
   1 TGATAATGCT CTTTCTACTC TTTGTAGCCC TTCCTTTCAT TCTTATTTTT CTTCTTCCTA
  61 AATTCAAAAA TGGTGGAAAT AACAGATTGC CACCAGGTCC TATAGGTTTA CCATTCATTG
 121 GAAATTTGCA TCAATATGAT AGTATAACTC CTCATATCTA TTTTTGGAAA CTTTCCAAAA
 181 AATATGGCAA AATCTTCTCA TTAAAACTTG CTTCTACTAA TGTGGTAGTA GTTTCTTCAG
 241 CAAAATTAGC AAAAGAAGTA TTGAAAAAAC AAGATTTAAT ATTTTGTAGT AGACCATCTA
 301 TTCTTGGCCA ACAAAAACTG TCTTATTATG GTCGTGATAT TGCTTTTGCA CCTTATAATG
 361 ATTATTGGAG AGAAATGAGA AAAATTTGTG TTCTTCATCT TTTTAGTTTA AAAAAAGTTC
 421 AATTATTTAG TCCAATTCGT GAAGATGAAG TTTTTAGAAT GATTAAGAAA ATATCAAAAC
 481 AAGCTTCTAC TTCACAAATT ATTAATTTGA GTAATTTAAT GATTTCATTA ACAAGTACAA
 541 TTATTTGTAG AGTTGCTTTT GGTGTTAGGT TTGAAGAAGA AGCACATGCA AGGAAGAGAT
 601 TTGATTTTCT TTTGGCCGAG GCACAAGAAA TGATGGCTAG TTTCTTTGTA TCTGATTTTT
 661 TTCCCTTTTT AAGTTGGATT GATAAATTAA GTGGATTGAC ATATAGACTT GAGAGGAATT
 721 TCAAGGATTT GGATAATTTT TATGAAGAAC TCATTGAGCA ACATCAAAAT CCTAATAAGC
 781 CAAAATATAT GGAAGGAGAT ATTGTTGATC TTTTGCTACA ATTGAAGAAA GAGAAATTAA
 841 CACCACTTGA TCTCACTATG GAAGATATAA AAGGAATTCT CATGAATGTG TTAGTTGCAG
 901 GATCAGACAC TAGTGCAGCT GCTACTGTTT GGGCAATGAC AGCCTTGATA AAGAATCCTA
 961 AAGCCATGGA AAAAGTTCAA TTAGAAATCA GAAAATCAGT TGGGAAGAAA GGCATTGTAA
1021 ATGAAGAAGA TGTCCAAAAC ATCCCTTATT TTAAAGCAGT GATAAAGGAA ATATTTAGAT
1081 TGTATCCACC AGCTCCACTT TTAGTTCCAA GAGAATCAAT GGAAAAAACC ATATTAGAAG
1141 GTTATGAAAT TCGGCCAAGA ACCATAGTTC ATGTTAACGC TTGGGCTATA GCAAGGGATC
1201 CTGAAATATG GGAAAATCCA GATGAATTTA TACCTGAGAG ATTTTTGAAT AGCAGTATCG
1261 ATTACAAGGG TCAAGATTTT GAGTTACTTC CATTTGGTGC AGGCAGAAGA GGTTGCCCAG
1321 GTATTGCACT TGGGGTTGCA TCCATGGAAC TTGCTTTGTC AAATCTTCTT TATGCATTTG
1381 ATTGGGAGTT GCCTTATGGA GTGAAAAAAG AAGACATCGA CACAAACGTT AGGCCTGGAA
1441 TTGCCATGCA CAAGAAAAAC GAACTTTGCC TTGTCCCAAA AAATTATTTA TAAATTATAT
1501 TGGGACGTGG ATCTCATGCT AGTTCTGTGC GGTCAGCTAA GCTTATTATT TTTGGCTCAA
1561 ATTATGTATA CATAATTAGT ACATGTTTAA AATGTATAAA TATAGTAGAA CCATTCTCAT
1621 GGTT
```

SEQ. ID. NO. 244

```
   1 MLFLLFVALP FILIFLLPKF KNGGNNRLPP GPIGLPFIGN LHQYDSITPH IYFWKLSKKY
  61 GKIFSLKLAS TNVVVVSSAK LAKEVLKKQD LIFCSRPSIL GQQKLSYYGR DIAFAPYNDY
 121 WREMRKICVL HLFSLKKVQL FSPIREDEVF RMIKKISKQA STSQIINLSN LMISLTSTII
 181 CRVAFGVRFE EEAHARKRFD FLLAEAQEMM ASFFVSDFFP FLSWIDKLSG LTYRLERNFK
 241 DLDNFYEELI EQHQNPNKPK YMEGDIVDLL LQLKKEKLTP LDLTMEDIKG ILMNVLVAGS
 301 DTSAAATVWA MTALIKNPKA MEKVQLEIRK SVGKKGIVNE EDVQNIPYFK AVIKEIFRLY
 361 PPAPLLVPRE SMEKTILEGY EIRPRTIVHV NAWAIARDPE IWENPDEFIP ERFLNSSIDY
 421 KGQDFELLPF GAGRRGCPGI ALGVASMELA LSNLLYAFDW ELPYGVKKED IDTNVRPGIA
 481 MHKKNELCLV PKNYL
```

FIG. 123

NAME D235-AB1
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 245

```
   1 AAAATTCATA ATGGTTTTTC CCATAGAAGC CTTTGTAGGA CTAGTAACCT TCACATTTCT
  61 CTTATACTTC CTATGGACAA AAAAATCTCA AAAACTTCCA AAACCCTTAC TACCGAAAAT
 121 CCCCGGAGGA TGGCCGGTAA TCGGCCATCT TTTTCACTTC AATAACGACG GCGACGACCG
 181 TCCATTAGCT CGAAAACTCG GAGACTTAGC TGATAAATAC GGCCCCGTTT TCACTTTTCG
 241 GCTAGGTCTT CCCCTTGTGC TAGTTGTAAG CAGTTACGAA GCTATAAAAG ATTGCTTCTC
 301 TACAAATGAC GCCATTTTCT CCAATCGTCC AGCTTTTCTT TACGGCGAAT ACCTTGGCTA
 361 CAATAATACA ATGCTTTTTC TAGCAAATTA CGGACCTTAC TGGCGAAAAA ATCGTAAATT
 421 AGTCATTCAG GAAGTTCTCT CTGCTAGTCG TCTCGAAAAA TTCAAACAAG TGAGATTCAC
 481 CAGAATTCAA ACGAGCATTA AGAATTTATA CACTCGAATT AATGGAAATT CGAGTACGAT
 541 AAATCTAACT GATTGGTTAG AAGAATTGGA TTTTGGTCTG ATCGTGAAAA TGATCGCTGG
 601 GAAAAATTAT GAATCCGGTA AAGGAGATGA ACAAGTGGAA AGATTTAAGA ATGCGTTTAA
 661 GGATTTTATG GTTTTATCAA TGGAATTTGT ATTATGGGAT GCATTTCCAA TTCCATTATT
 721 TAAATGGGTG GATTTTCAAG GTCATATTAA GGCAATGAAA AGGACATTTA AGGATATAGA
 781 TTCTGTTTTT CAGAACTGGT TAGAGGAACA TATTAATAAA AGAGAAAAAA TGGAGGTTGG
 841 TGCAGAAGGG AATGAACAAG ATTTCATTGA TGTGGTGCTT TCAAAATTGA GTAAAGAATA
 901 TCTTGATGAA GGTTACTCTC GTGATACTGT CATTAAAGCA ACAGTTTTTA GTTTGGTCTT
 961 GGATGCAGCA GACACAGTTG CTCTTCACAT AAATTGGGGA ATGACATTAT TGATAAACAA
1021 TCAAAATGCC TTGATGAAAG CACAAGAAGA GATAGACACA AAAGTTGGTA AGTATAGATG
1081 GGTAGAAGAG AGTGATATTA AGGATTTAGT ATACCTCCAA GCTATTGTTA AAAAGGTGTT
1141 ACGATTATAT CCACCAGGAC CTTTGTTAGT ACCACATGAA TATGTAAAGG ATTGTGTTGT
1201 TAGTGGATAT CACATTCCTA AAGGGACTAG ATTATTCGCA AACGTCATGA AACTGCAGCG
1261 CGATCCTAAA CTCTTGTCAA ATCCTGATAA GTTCGATCCA GAGAGATTCA TCGCTGGTGA
1321 TATCGACTTC CGTGGTCACC ACTATGAGTT TATCCCATTT GGTTCTGGAA GACGATCTTG
1381 TCCGGGGATG ACTTATGCAT TGCAAGTGGA ACACCTAACA ATGGCACATT TAATCCAGGG
1441 TTTCAATTAC AAAACTCCAA ATGACGAGGC CTTGGATATG AAGGAAGGTG CAGGCATAAC
1501 AATACGTAAG GTAAATCCGG TGGAATTGAT AATAACGCCT CGCTTGGCAC CTGAGCTTTA
1561 CTAAAACCTA AGATCTTTCA TCTTGGTTGA TCATTGTTTA ATACTCCTAG ATAGATGGGT
1621 ATTCATC
```

SEQ. ID. NO. 246

```
   1 MVFPIEAFVG LVTFTFLLYF LWTKKSQKLP KPLLPKIPGG WPVIGHLFHF NNDGDDRPLA
  61 RKLGDLADKY GPVFTFRLGL PLVLVVSSYE AIKDCFSTND AIFSNRPAFL YGEYLGYNNT
 121 MLFLANYGPY WRKNRKLVIQ EVLSASRLEK FKQVRFTRIQ TSIKNLYTRI NGNSSTINLT
 181 DWLEELDFGL IVKMIAGKNY ESGKGDEQVE RFKNAFKDFM VLSMEFVLWD AFPIPLFKWV
 241 DFQGHIKAMK RTFKDIDSVF QNWLEEHINK REKMEVGAEG NEQDFIDVVL SKLSKEYLDE
 301 GYSRDTVIKA TVFSLVLDAA DTVALHINWG MTLLINNQNA LMKAQEEIDT KVGKYRWVEE
 361 SDIKDLVYLQ AIVKKVLRLY PPGPLLVPHE YVKDCVVSGY HIPKGTRLFA NVMKLQRDPK
 421 LLSNPDKFDP ERFIAGDIDF RGHHYEFIPF GSGRRSCPGM TYALQVEHLT MAHLIQGFNY
 481 KTPNDEALDM KEGAGITIRK VNPVELIITP RLAPELY
```

FIG. 124

NAME D243-AA2
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 247

```
   1 CAAAAAATCA TTTCTCTCGT CTAAAATGGA TCTTCTCTTA CTAGAGAAGA CCTTAATTGG
  61 TCTTTTCTTT GCCATTTTAA TCGCTTTAAT TGTCTCTAAA CTTCGTTCAA AGCGTTTTAA
 121 GCTTCCTCCA GGACCAATTC CAGTACCAGT TTTTGGTAAT TGGCTTCAAG TTGGTGATGA
 181 TTTAAACCAC AGAAATCTTA CTGATTATGC CAAAAAATTT GGCGATCTTT TCTTGTTAAG
 241 AATGGGTCAA CGTAACTTAG TTGTTGTGTC ATCTCCTGAA TTAGCTAAAG AAGTTTTACA
 301 CACACAAGGT GTTGAATTTG GTTCAAGAAC AAGAAATGTT GTGTTTGATA TTTTTACTGG
 361 AAAAGGTCAA GATATGGTTT TTACTGTATA TGGTGAACAT TGGAGAAAAA TGAGGAGAAT
 421 TATGACTGTA CCATTTTTTA CTAATAAAGT TGTGCAACAG TATAGAGGGG GGTGGGAGTT
 481 TGAGGTGGCA AGTGTAATTG AGGATGTGAA AAAAAATCCT GAATCTGCTA CTAATGGGAT
 541 CGTATTAAGG AGGAGATTAC AATTAATGAT GTATAATAAT ATGTTTAGGA TTATGTTTGA
 601 TAGGAGATTT GAGAGTGAAG ATGATCCTTT GTTTGTTAAG CTTAAGGCTT TGAATGGTGA
 661 AAGGAGTAGA TTGGCTCAAA GTTTTGAGTA TAATTATGGT GATTTTATTC CAATTTTGAG
 721 GCCTCTTTTG AGAGGTTATT TGAAGATCTG TAAAGAAGTT AAGGAGAAGA GGCTGCAGCT
 781 TTTCAAAGAT TACTTTGTTG ATGAAAGAAA GAAGCTTTCA AATACCAAGA GCTCGGACAG
 841 CAATGCCCTA AAATGTGCGA TTGATCACAT TCTTGAGGCT CAACAGAAGG GAGAGATCAA
 901 TGAGGACAAC GTTCTTTACA TTGTTGAAAA CATCAATGTT GCTGCAATTG AAACAACATT
 961 ATGGTCAATT GAGTGGGGTA TCGCCGAGCT AGTCAACCAC CCTCACATCC AAAAGAAACT
1021 GCGCGACGAG ATTGACACAG TTCTTGGACC AGGAGTGCAA GTGACTGAAC CAGACACCCA
1081 CAAGCTTCCA TACCTTCAGG CTGTGATCAA GGAGGCACTT CGTCTCCGTA TGGCAATTCC
1141 TCTATTAGTC CCACACATGA ACCTTCACGA CGCAAAGCTT GGCGGGCTTG ATATTCCAGC
1201 AGAGAGCAAA ATCTTGGTTA ACGCTTGGTG GTTAGCTAAC AACCCGGCTC ATTGGAAGAA
1261 ACCCGAAGAG TTCAGACCCG AGAGGTTCTT TGAAGAGGAG AAGCATGTTG AGGCCAATGG
1321 CAATGACTTC AGATATCTTC CGTTTGGCGT TGGTAGGAGG AGCTGCCCTG GAATTATACT
1381 TGCATTGCCA ATTCTTGGCA TCACTTTGGG ACGTTTGGTT CAGAACTTTG AGCTGTTGCC
1441 TCCTCCAGGC CAGTCGAAGC TCGACACCAC AGAGAAAGGT GGACAGTTCA GTCTCCACAT
1501 TTTGAAGCAT TCCACCATTG TGTTGAAACC AAGGTCTTTC TGAACTTTGT GATCTTATTA
1561 ATTAAGGGGT TCTGAAGAAA TTTGATAGTG TTGG
```

SEQ. ID. NO. 248

```
   1 MDLLLLEKTL IGLFFAILIA LIVSKLRSKR FKLPPGPIPV PVFGNWLQVG DDLNHRNLTD
  61 YAKKFGDLFL LRMGQRNLVV VSSPELAKEV LHTQGVEFGS RTRNVVFDIF TGKGQDMVFT
 121 VYGEHWRKMR RIMTVPFFTN KVVQQYRGGW EFEVASVIED VKKNPESATN GIVLRRRLQL
 181 MMYNNMFRIM FDRRFESEDD PLFVKLKALN GERSRLAQSF EYNYGDFIPI LRPLLRGYLK
 241 ICKEVKEKRL QLFKDYFVDE RKKLSNTKSS DSNALKCAID HILEAQQKGE INEDNVLYIV
 301 ENINVAAIET TLWSIEWGIA ELVNHPHIQK KLRDEIDTVL GPGVQVTEPD THKLPYLQAV
 361 IKEALRLRMA IPLLVPHMNL HDAKLGGLDI PAESKILVNA WWLANNPAHW KKPEEFRPER
 421 FFEEEKHVEA NGNDFRYLPF GVGRRSCPGI ILALPILGIT LGRLVQNFEL LPPPGQSKLD
 481 TTEKGGQFSL HILKHSTIVL KPRSF
```

FIG. 125

NAME D244-AD4
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 249

```
   1 AACATTTTGC AATATAGTTT TCCTAGTCAG TTCTAGCCTC CTTTTCCTTA GAAATAATGG
  61 ATTATCATAT TTCTTTCCAT TTTCAAGCTC TTTTAGGGCT TTTAGCCTTT GTGTTCTTGT
 121 CTATTATCTT ATGGAGAAGA ACACTCACTT CAAGAAAATT AGCCCCTGAA ATCCCAGGGG
 181 CATGGCCTAT TATAGGCCAT CTTCGTCAGC TGAGTGGTAC TGATAAGAAT ATCCCATTTC
 241 CCCGAATATT GGGCGCTTTG GCAGATAAAT ATGGACCTGT CTTCACACTG AGAATAGGGA
 301 TGTACCCCTA TTTGATTGTC AACAATTGGG AAGCAGCTAA GGATTGTCTC ACAACGCATG
 361 ATAAGGACTT CGCTGCCCGA CCAACTTCTA TGGCTGGTGA AAGCATCGGG TACAAGTATG
 421 CGAGGTTTAC TTATGCTAAT TTTGGTCCTT ATTATAACCA AGTGCGCAAA CTAGCCCTAC
 481 AACATGTACC CTCGAGTACT AAACTCGAGA AAATGAAACA CATACGTGTT TCTGAATTGG
 541 AAACTAGCAT CAAAGAATTA TATTCTTTGA CGCTGGGCAA AAACAACATG CAAAAAGTGA
 601 ATATAAGTAA ATGGTTTGAA CAATTGACTT TAAACATAAT CGTGAAGACA ATTTGTGGCA
 661 AGAGATATAG CAACATAGAG GAGGATGAAG AGGCACAACG TTTCAGAAAG GCATTTAAGG
 721 GCATCATGTT TGTTGTAGGG CAAATTGTTT TATATGACGC AATTCCATTC CCATTGTTCA
 781 AATACTTTGA TTTCCAAGGT CATATACAAT TGATGAACAA AATTTATAAA GACTTAGATT
 841 CTATTCTTCA AGGATGGTTG GATGATCATA TGATGAACAA GGATGTAAAC AATAAGGATC
 901 AAGATGCCAT AGATGCCATG CTTAAGGTAA CACAACTTAA TGAATTCAAA GCCTATGGTT
 961 TTTCTCAGGC CACTGTGATC AAGTCGACAG TCTTGAGTTT GATCTTAGAT GGAAATGACA
1021 CAACCGCTGT TCATTTGATA TGGGTAATGT CCTTATTACT GAACAATCCA CATGTTATGA
1081 AACAAGGCCA AGAAGAGATA GACATGAAAG TGGGTAAAGA GAGGTGGATT GAAGATACTG
1141 ACATAAAAAA TTTAGTGTAC CTTCAGGCTA TCGTTAAAGA GACATTGCGC TTGTATCCAC
1201 CTGTTCCTTT TCTTTTACCA CACGAAGCAG TGCAAGATTG TAAAGTGACT GGTTACCACA
1261 TTCCTAAAGG TACTCGTCTA TATATCAATG CGTGGAAAGT ACATCGCGAT CCTGAAATTT
1321 GGTCAGAGCC CGAAAAGTTT ATGCCCAATA GATTCTTGAC TAGCAAAGCA AATATAGATG
1381 CTCGCGGTCA AAATTTTGAA TTTATACCGT TTGGTTCTGG GAGACGGTCA TGTCCAGGGA
1441 TAGGTTTTGC GACTTTAGTG ACACATCTGA CTTTTGGTCG CTTGCTTCAA GGTTTTGATT
1501 TTAGTAAGCC ATCAAACACG CCAATTGACA TGACAGAAGG CGTAGGCGTT ACTTTGCCTA
1561 AGGTTAATCA AGTTGAAGTT CTAATTACCC CTCGTTTACC TTCTAAGCTT TATTTATTTT
1621 GAAAGTGCAA ATCATCAATC ATGGCTTGAG TAATTAGTTA TACTTTAATA TGTTTCTC
```

SEQ. ID. NO. 250

```
   1 MDYHISFHFQ ALLGLLAFVF LSIILWRRTL TSRKLAPEIP GAWPIIGHLR QLSGTDKNIP
  61 FPRILGALAD KYGPVFTLRI GMYPYLIVNN WEAAKDCLTT HDKDFAARPT SMAGESIGYK
 121 YARFTYANFG PYYNQVRKLA LQHVPSSTKL EKMKHIRVSE LETSIKELYS LTLGKNNMQK
 181 VNISKWFEQL TLNIIVKTIC GKRYSNIEED EEAQRFRKAF KGIMFVVGQI VLYDAIPFPL
 241 FKYFDFQGHI QLMNKIYKDL DSILQGWLDD HMMNKDVNNK DQDAIDAMLK VTQLNEFKAY
 301 GFSQATVIKS TVLSLILDGN DTTAVHLIWV MSLLLNNPHV MKQGQEEIDM KVGKERWIED
 361 TDIKNLVYLQ AIVKETLRLY PPVPFLLPHE AVQDCKVTGY HIPKGTRLYI NAWKVHRDPE
 421 IWSEPEKFMP NRFLTSKANI DARGQNFEFI PFGSGRRSCP GIGFATLVTH LTFGRLLQGF
 481 DFSKPSNTPI DMTEGVGVTL PKVNQVEVLI TPRLPSKLYL F
```

FIG. 126

NAME D247-AH1
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 251

```
   1 TGATAATGCT CTTTCTACTC TTTGTAGCCC TTCCTTTCAT TCTTATTTTT CTTCTTCCTA
  61 AATTCAAAAA TGGTGGAAAT AACAGATTGC CACCAGGTCC TATAGGTTTA CCATTCATTG
 121 GAAATTTGCA TCAATATGAT AGTATAACTC CTCATATCTA TTTTTGGAAA CTTTCCAAAA
 181 AATATGGCAA AATCTTCTCA TTAAAACTTG CTTCTACTAA TGTGGTAGTA GTTTCTTCAG
 241 CAAAATTAGC AAAAGAAGTA TTGAAAAAAC AAGATTTAAT ATTTTGTAGT AGACCATCTA
 301 TTCTTGGCCA ACAAAAACTG TCTTATTATG GTCGTGATAT TGCTTTTGCA CCTTATAATG
 361 ATTATTGGAG AGAAATGAGA AAAATTTGTG TTCTTCATCT TTTTAGTTTA AAAAAAGTTC
 421 AATTATTTAG TCCAATTCGT GAAGATGAAG TTTTTAGAAT GATTAAGAAA ATATCAAAAC
 481 AAGCTTCTAC TTCACAAATT ATTAATTTGA GTAATTTAAT GATTTCATTA ACAAGTACAA
 541 TTATTTGTAG AGTTGCTTTT GGTGTTAGGT TTGAAGAAGA AGCACATGCA AGGAAGAGAT
 601 TTGATTTTCT TTTGGCCGAG GCACAAGAAA TGATGGCTAG TTTCTTTGTA TCTGATTTTT
 661 TTCCCTTTTT AAGTTGGATT GATAAATTAA GTGGATTGAC ATATAGACTT GAGAGGAATT
 721 TCAAGGATTT GGATAATTTT TATGAAGAAC TCATTGAGCA ACATCAAAAT CCTAATAAGC
 781 CAAAATATAT GGAAGGAGAT ATTGTTGATC TTTTGCTACA ATTGAAGAAA GAGAAATTAA
 841 CACCACTTGA TCTCACTATG GAAGATATAA AAGGAATTCT CATGAATGTG TTAGTTGCAG
 901 GATCAGACAC TAGTGCAGCT GCTACTGTTT GGGCAATGAC AGCCTTGATA AAGAATCCTA
 961 AAGCCATGGA AAAAGTTCAA TTAGAAATCA GAAAATCAGT TGGGAAGAAA GGCATTGTAA
1021 ATGAAGAAGA TGTCCAAAAC ATCCCTTATT TTAAAGCAGT GATAAAGGAA ATATTTAGAT
1081 TGTATCCACC AGCTCCACTT TTAGTTCCAA GAGAATCAAT GGAAAAAACC ATATTAGAAG
1141 GTTATGAAAT TCGGCCAAGA ACCATAGTTC ATGTTAACGC TTGGGCTATA GCAAGGGATC
1201 CTGAAATATG GGAAAATCCA GATGAATTTA TACCTGAGAG ATTTTTGAAT AGCAGTACCG
1261 ATTACAAGGG TCAAGATTTT GAGTTACTTC CATTTGGTGC AGGCAGAAGA GGTTGCCCAG
1321 GTATTGCACT TGGGGTTGCA TCCATGGAAC TTGCTTTGTC AAATCTTCTT TATGCATTTG
1381 ATTGGGAGTT GCCTTATGGA GTGAAAAAAG AAGACATCGA CACAAACGTT AGGCCTGGAA
1441 TTGCCATGCA CAAGAAAAAC GAACTTTGCC TTGTCCCAAA AAATTATTTA TAAATTATAT
1501 TGGGACGTGG ATCTCAATTT AGTTCTGTGA GGTCAGC
```

SEQ. ID. NO. 252

```
   1 MLFLLFVALP FILIFLLPKF KNGGNNRLPP GPIGLPFIGN LHQYDSITPH IYFWKLSKKY
  61 GKIFSLKLAS TNVVVVSSAK LAKEVLKKQD LIFCSRPSIL GQQKLSYYGR DIAFAPYNDY
 121 WREMRKICVL HLFSLKKVQL FSPIREDEVF RMIKKISKQA STSQIINLSN LMISLTSTII
 181 CRVAFGVRFE EEAHARKRFD FLLAEAQEMM ASFFVSDFFP FLSWIDKLSG LTYRLERNFK
 241 DLDNFYEELI EQHQNPNKPK YMEGDIVDLL LQLKKEKLTP LDLTMEDIKG ILMNVLVAGS
 301 DTSAAATVWA MTALIKNPKA MEKVQLEIRK SVGKKGIVNE EDVQNIPYFK AVIKEIFRLY
 361 PPAPLLVPRE SMEKTILEGY EIRPRTIVHV NAWAIARDPE IWENPDEFIP ERFLNSSTDY
 421 KGQDFELLPF GAGRRGCPGI ALGVASMELA LSNLLYAFDW ELPYGVKKED IDTNVRPGIA
 481 MHKKNELCLV PKNYL
```

FIG. 127

NAME D248-AA6
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 253

```
   1 CCAAAATCAT GGCTCTATCT TTCATATTCA TATCCATAAC CCTAATTTTT CTAGTTCATA
  61 AACTCTACCA CCGTCTTAGA TTCAAACTAC CACCAGGTCC GCGGCCGTTA CCGGTGGTCG
 121 GAAACCTCTA CGACATAAAA CCGGTGAGAT TCCGGTGCTT TGCCGATTGG GCCAAAACTT
 181 ACGGTCCGAT TTTCTCAGTA TACTTTGGGT CACAGTTAAA TGTTGTGGTA ACAACAGCTG
 241 AATTAGCTAA AGAAGTATTG AAAGAAAATG ACCAGAATTT AGCAGATAGA TTTAGGACTA
 301 GACCTGCAAA TAATTTGAGC AGAAATGGGA TGGATTTGAT TTGGGCTGAT TATGGGCCTC
 361 ATTATGTGAA AGTAAGGAAG CTCTGTAATC TTGAGCTTTT TACTCCTAAA AGACTTGAAG
 421 CTCTTAGACC TATTAGAGAA GATGAAGTTA CTGCTATGGT TGAAAACATT TTCAAGGATT
 481 GTACTAAGCC TGATAACACA GGTAAAAGCT TGTTGATAAG AGAGTACTTA GGATCAGTAG
 541 CATTCAACAA CATTACAAGG TTAACATTTG GGAAAAGGTT CATGAACTCA AAAGGTGAGA
 601 TTGATGAGCA AGGTCAAGAA TTCAAGGGTA TTGTCTCTAA TGGCATCAAA ATTGGCGGAA
 661 AACTTCCCTT GGCAGAGTAT GTTCCATGGC TCCGTTGGTT TTTCACAATG GAAAACGAGG
 721 CACTCGTGAA GCACTCTGCA CGTAGAGACC GGTTAACAAG AATGATCATG GATGAACACA
 781 CACTGGCTCG CAAGAAAACT GGTGATACTA AGCAGCATTT TGTCGATGCA TTGCTTACTC
 841 TTCAGAAGCA GTATGATCTT AGTGATGACA CTGTTATTGG CCTCCTCTGG GATATGATTA
 901 CAGCAGGAAT GGACACAACA ACCATAACAG TGGAATGGGC AATGGCAGAA CTAGTTAAGA
 961 ACCCAAGAGT GCAACTAAAA GCTCAAGAGG AGCTTGACAG GGTAATCGGA ACGGATCGAA
1021 TCATGTCAGA AACCGATTTC TCTAAACTTC CTTACCTACA ATGTGTAGCC AAAGAGGCTC
1081 TAAGGTTGCA CCCTCCAACT CCTCTAATGC TTCCTCATAA GGCCAGTGCC AGTGTCAAAA
1141 TTGGTGGTTA TGACATTCCT AAGGGGTCCA TCGTGCACGT GAACGTTTGG GCTGTCGCTC
1201 GTGACCCAGC CGTGTGGAAG AACCCGTTGG AGTTCAGACC AGAGCGCTTC CTTGAGGAAG
1261 ACGTTGACAT GAAGGGTCAC GACTATCGGT TATTGCCCTT TGGTGCAGGA AGGCGTGTTT
1321 GCCCCGGTGC ACAACTTGCT ATCAACTTGG TCACATCTAT GTTGGGTCAT TTGTTGCATC
1381 ATTTTACATG GGCTCCGGCC CCGGGGGTTA ACCCGGAGGA TATTGACTTG GAGGAGAGCC
1441 CTGGAACAGT AACTTACATG AAAAATCCAA TACAAGCTAT TCCAACTCCA AGATTGCCTG
1501 CACACTTGTA TGGACGTGTG CCAGTGGATA TGTAAAACAT TTTGTTCTTT CCCTTTTTGG
1561 TTATATGATG AG
```

SEQ. ID. NO. 254

```
  1 MALSFIFISI TLIFLVHKLY HRLRFKLPPG PRPLPVVGNL YDIKPVRFRC FADWAKTYGP
 61 IFSVYFGSQL NVVVTTAELA KEVLKENDQN LADRFRTRPA NNLSRNGMDL IWADYGPHYV
121 KVRKLCNLEL FTPKRLEALR PIREDEVTAM VENIFKDCTK PDNTGKSLLI REYLGSVAFN
181 NITRLTFGKR FMNSKGEIDE QGQEFKGIVS NGIKIGGKLP LAEYVPWLRW FFTMENEALV
241 KHSARRDRLT RMIMDEHTLA RKKTGDTKQH FVDALLTLQK QYDLSDDTVI GLLWDMITAG
301 MDTTTITVEW AMAELVKNPR VQLKAQEELD RVIGTDRIMS ETDFSKLPYL QCVAKEALRL
361 HPPTPLMLPH KASASVKIGG YDIPKGSIVH VNVWAVARDP AVWKNPLEFR PERFLEEDVD
421 MKGHDYRLLP FGAGRRVCPG AQLAINLVTS MLGHLLHHFT WAPAPGVNPE DIDLEESPGT
481 VTYMKNPIQA IPTPRLPAHL YGRVPVDM
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FIG. 128

```
NAME          D249-AE8
ORGANISM      NICOTIANA TABACUM
SEQ. ID. NO. 255
       1 AATCACTAAT TTTCATGTAC TCTCATAGGT CAAAAGTTTC AACCAAAATC ATGGCTCTAT
      61 CCTTCATATT CATATCCATA ACCCTAATTT TTCTAGTTCA TAAACTCTAC CACCGTCTTA
     121 GATTCAAACT ACCACCAGGT CCGCGGCCGT TACCGGTGGT CGGAAACCTC TACGACATAG
     181 AACCGGTGAG ATTCCGGTGC TTTGCCGATT GGGCCAAAAC TTACGGTCCG ATTTTCTCAG
     241 TATACTTTGG GTCACAGTTA AATGTTGTGG TAACAACAGC TGAATTAGCT AAAGAAGTAT
     301 TGAAAGAAAA TGACCAGAAT TTAGCAGATA GATTTAGGAC TAGACCTGCA AATAATTTGA
     361 GCAGAAATGG GATGGATTTG ATTTGGGCTG ATTATGGGCC TCATTATGTG AAAGTAAGGA
     421 AGCTCTGTAA TCTTGAGCTT TTTACTCCTA AAAGACTTGA AGCTCTTAGA CCTATTAGAG
     481 AAGATGAAGT TACTGCTATG GTTGAAAACA TTTTCAAGGA TTGTACTAAG CCTGATAACA
     541 CAGGTAAAAG CTTGTTGATA AGAGAGTACT TAGGATCAGT AGCATTCAAC AACATTACAA
     601 GGTTAACATT TGGGAAAAGG TTCATGAACT CAAAAGGTGA GATTGATGAG CAAGGTCAAG
     661 AATTCAAGGG TATTGTCTCT AATGGCATCA AAATTGGCGG AAAACTTCCC TTGGCAGAGT
     721 ATGTTCCATG GCTCCGTTGG TTTTTCACAA TGGAAAACGA GGCACTCGTG AAGCACTCTG
     781 CACGTAGAGA CCGGTTAACA AGAATGATCA TGGATGAACA CACACTGGCT CGCAAGAAAA
     841 CTGGTGATAC TAAGCAGCAT TTTGTCGATG CATTGCTTAC TCTTCAGAAG CAGTATGATC
     901 TTAGTGATGA CACTGTTATT GGCCTCCTCT GGGATATGAT TACAGCAGGA ATGGACACAA
     961 CAACCATAAC AGTGGAATGG GCAATGGCAG AACTAGTTAA GAACCCAAGA GTGCAACTAA
    1021 AAGCTCAAGA GGAGCTTGAC AGGGTAATCG GAACGGATCG AATCATGTCA GAAACCGATT
    1081 TCTCTAAACT TCCTTACCTA CAATGTGTAG CCAAAGAGGC TCTAAGGTTG CACCCTCCAA
    1141 CTCCTCTAAT GCTTCCTCAT AGGGCCAGTG CCAGTGTCAA AATTGGTGGT TATGACATTC
    1201 CTAAGGGGTC CATCGTGCAC GTGAACGTTT GGGCTGTCGC TCGTGACCCA GCCGTGTGGA
    1261 AGAACCCGTT GGAGTTCAGA CCAGAGCGCT TCCTTGAGGA AGACGTTGAC ATGAAGGGTC
    1321 ACGACTATCG GTTATTGCCC TTTGGTGCAG GAAGGCGTGT TTGCCCCGGT GCACAACTTG
    1381 CTATCAACTT GGTCACATCT ATGTTGGGTC ATTTGTTGCA TCATTTTACA TGGGCTCCGG
    1441 CCCCGGGGGT TAACCCGGAG GATATTGACT TGGAGGAGAG CCCTGGAACA GTAACTTACA
    1501 TGAAAAATCC AATACAAGCT ATTCCAACTC CAAGATTGCC TGCACACTTG TATGGACGTG
    1561 TGCCAGTGGA TATGTAAAAC

SEQ. ID. NO. 256
       1 MYSHRSKVST KIMALSFIFI SITLIFLVHK LYHRLRFKLP PGPRPLPVVG NLYDIEPVRF
      61 RCFADWAKTY GPIFSVYFGS QLNVVVTTAE LAKEVLKEND QNLADRFRTR PANNLSRNGM
     121 DLIWADYGPH YVKVRKLCNL ELFTPKRLEA LRPIREDEVT AMVENIFKDC TKPDNTGKSL
     181 LIREYLGSVA FNNITRLTFG KRFMNSKGEI DEQGQEFKGI VSNGIKIGGK LPLAEYVPWL
     241 RWFFTMENEA LVKHSARRDR LTRMIMDEHT LARKKTGDTK QHFVDALLTL QKQYDLSDDT
     301 VIGLLWDMIT AGMDTTTITV EWAMAELVKN PRVQLKAQEE LDRVIGTDRI MSETDFSKLP
     361 YLQCVAKEAL RLHPPTPLML PHRASASVKI GGYDIPKGSI VHVNVWAVAR DPAVWKNPLE
     421 FRPERFLEED VDMKGHDYRL LPFGAGRRVC PGAQLAINLV TSMLGHLLHH FTWAPAPGVN
     481 PEDIDLEESP GTVTYMKNPI QAIPTPRLPA HLYGRVPVDM
```

FIG. 129

NAME D250-AC11
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 257

```
   1 ATAATGCTCT TTCTACTCTT TGTAGCCCTT CCTTTCATTC TTATTTTTCT TCTTCCTAAA
  61 TTCAAAAATG GTGGAAATAA CAGATTGCCA CCAGGTCCTA TAGGTTTACC ATTCATTGGA
 121 AATTTGCATC AATATGATAG TATAACTCCT CATATCTATT TTTGGAAACT TTCCAAAAAA
 181 TATGGCAAAA TCTTCTCATT AAAACTTGCT TCTACTAATG TGGTAGTAGT TTCTTCAGCA
 241 AAATTAGCAA AAGAAGTATT GAAAAAACAA GATTTAATAT TTTGTAGTAG ACCATCTATT
 301 CTTGGCCAAC AAAAACTGTC TTATTATGGT CGTGATATTG CTTTTGCACC TTATAATGAT
 361 TATTGGAGAG AAATGAGAAA AATTTGTGTT CTTCATCTTT TTAGTTTAAA AAAAGTTCAA
 421 TTATTTAGTC CAATTCGTGA AGATGAAGTT TTTAGAATGA TTAAGAAAAT ATCAAAACAA
 481 GCTTCTACTT CACAAATTAT TAATTTGAGT AATTTAATGA TTTCATTAAC AAGTACAATT
 541 ATTTGTAGAG TTGCTTTTGG TGTTAGGTTT GAAGAAGAAG CACATGCAAG GAAGAGATTT
 601 GATTTTCTTT TGGCCGAGGC ACAAGAAATG ATGGCTAGTT TCTTTGTATC TGATTTTTTT
 661 CCCTTTTTAA GTTAGATTGA CAAATTAAGT GGATTGACAT ATAGACTTGA GAGGAATTTC
 721 AAGGATTTGG ATAATTTTTA TGAAGAACTC ATTGAGCAAC ATCAAAATCC TAATAAGCCA
 781 AAATATATGG AAGGAGATAT TGTTGATCTT TTGCTACAAT TGAAGAAAGA GAAATTAACA
 841 CCACTTGATC TCACTATGGA AGATATAAAA GGAATTCTCA TGAATGTGTT AGTTGCAGGA
 901 TCAGACACTA GTGCAGCTGC TACTGTTTGG GCAATGACAG CCTTGATAAA GAATCCTAAA
 961 GCCATGGAAA AAGTTCAATT AGAAATCAGA AAATCAGTTG GGAAGAAAGG CATTGTAAAT
1021 GAAGAAGATG TCCAAAACAT CCCTTATTTT AAAGCAGTGA TAAAGGAAAT ATTTAGATTG
1081 TATCCACCAG CTCCACTTTT AGTTCCAAGA GAATCAATGG AAAAAACCAT ATTAGAAGGT
1141 TATGAAATTC GGCCAAGAAC CATAGTTCAT GTTAACGCTT GGGCTATAGC AAGGGATCCT
1201 GAAATATGGG AAAATCCAGA TGAATTTATA CCTGAGAGAT TTTTGAATAG CAGTATCGAT
1261 TACAAGGGTC AAGATTTTGA GTTACTTCCA TTTGGTGCAG GCAGAAGAGG TTGCCCAGGT
1321 ATTGCACTTG GGGTTGCATC CATGGAACTT GCTTTGTCAA ATCTTCTTTA TGCATTTGAT
1381 TGGGAGTTGC CTTATGGAGT GAAAAAAGAA GACATCGACA CAAACGTTAG GCCTGGAATT
1441 GCCATGCACA AGAAAAACGA ACTTTGCCTT GTCCCAAAAA AATTATTTAT AAATTATATT
1501 GGGACGTGGA TCTCATGCTA GTTCTGTGCG GTCAGCTAAG CTTA
```

SEQ. ID. NO. 258

```
   1 MLFLLFVALP FILIFLLPKF KNGGNNRLPP GPIGLPFIGN LHQYDSITPH IYFWKLSKKY
  61 GKIFSLKLAS TNVVVVSSAK LAKEVLKKQD LIFCSRPSIL GQQKLSYYGR DIAFAPYNDY
 121 WREMRKICVL HLFSLKKVQL FSPIREDEVF RMIKKISKQA STSQIINLSN LMISLTSTII
 181 CRVAFGVRFE EEAHARKRFD FLLAEAQEMM ASFFVSDFFP FLS.IDKLSG LTYRLERNFK
 241 DLDNFYEELI EQHQNPNKPK YMEGDIVDLL LQLKKEKLTP LDLTMEDIKG ILMNVLVAGS
 301 DTSAAATVWA MTALIKNPKA MEKVQLEIRK SVGKKGIVNE EDVQNIPYFK AVIKEIFRLY
 361 PPAPLLVPRE SMEKTILEGY EIRPRTIVHV NAWAIARDPE IWENPDEFIP ERFLNSSIDY
 421 KGQDFELLPF GAGRRGCPGI ALGVASMELA LSNLLYAFDW ELPYGVKKED IDTNVRPGIA
 481 MHKKNELCLV PKKLFINYIG TWISC
```

FIG. 130

```
NAME          D259-AB9
ORGANISM      NICOTIANA TABACUM
SEQ. ID. NO. 259
     1 CACATTGAGT CCTCTCCCAA ATCACTGATT CACCACCAAA AGTACCAACA ATTCAATGGA
    61 AGGTACAAAC TTGACTACAT ATGCAGCAGT ATTTCTTGAT ACTCTGTTTC TTTTGTTCCT
   121 TTCCAAACTT CTTCGCCAGA GGAAACTCAA TTTACCTCCA GGCCCAAAAC CATGGCCGAT
   181 CATCGGAAAC TTAAACCTTA TTGGCAATCT TCCTCATCGC TCAATCCACG AACTCTCCCT
   241 CAAGTACGGA CCCGTTATGC AACTCCAATT CGGGTCTTTC CCCGTTGTAG TTGGATCCTC
   301 CGTCGAAATG GCTAAGATTT TCCTCAAATC CATGGATATT AACTTTGTAG GCAGGCCTAA
   361 AACGGCTGCC GGAAAATACA CAACGTACAA TTATTCCGAT ATTACATGGT CTCCTTACGG
   421 ACCATATTGG CGCCAGGCAC GTAGGATGTG CCTAACGGAA TTATTCAGCA CGAAACGTCT
   481 CGATTCATAC GAGTATATTC GGGCTGAGGA GTTGCATTCT CTTCTCCATA ATTTGAACAA
   541 AATATCAGGG AAACCAATTG TGTTGAAAGA TTATTTGACG ACGTTGAGTT TAAATGTTAT
   601 TAGCAGGATG GTACTGGGGA AAAGGTATTT GGACGAATCC GAGAACTCGT TCGTGAATCC
   661 TGAGGAATTT AAGAAGATGT TGGACGAATT GTTTTTGCTA AATGGTGTAC TTAATATTGG
   721 AGATTCAATT CCATGGATTG ATTTCATGGA TTTGCAAGGT TATGTTAAGA GGATGAAAGT
   781 AGTGAGCAAG AAATTCGACA AGTTTTTAGA GCATGTTATT GATGAGCATA ACATTAGGAG
   841 AAATGGAGTG GAGAATTATG TTGCTAAGGA TATGGTGGAT GTTTTGTTGC AGCTTGCTGA
   901 TGATCCGAAG TTGGAAGTTA AGCTGGAGAG ACATGGAGTC AAAGCATTCA CTCAGGATAT
   961 GCTGGCTGGT GGAACCGAGA GTTCAGCAGT GACAGTGGAG TGGGCAATTT CAGAGCTGCT
  1021 AAAGAAGCCG GAGATTTTCA AAAAGGCTAC AGAAGAATTG GATCGAGTAA TTGGGCAGAA
  1081 TAGATGGGTA CAAGAAAAGG ACATTCCAAA TCTTCCTTAC ATAGAGGCAA TAGTCAAAGA
  1141 GACTATGCGA CTGCACCCCG TGGCACCAAT GTTGGTGCCA CGTGAGTGTC GAGAAGATAT
  1201 TAAGGTAGCA GGCTACGACG TTCAGAAAGG AACTAGGGTT CTCGTGAGTG TATGGACTAT
  1261 TGGAAGAGAC CCTACATTGT GGGACGAGCC TGAGGTGTTC AAGCCGGAGA GATTCCATGA
  1321 AAAGTCCATA GATGTTAAAG GACATGATTA TGAGCTTTTG CCATTTGGAG CGGGGAGAAG
  1381 AATGTGCCCG GGTTATAGCT TGGGGCTCAA GGTGATTCAA GCTAGCTTAG CTAATCTTCT
  1441 ACATGGATTT AACTGGTCAT TGCCTGATAA TATGACTCCT GAGGACCTCA ACATGGATGA
  1501 GATTTTTGGG CTCTCTACAC CTAAAAAATT TCCACTTGCT ACTGTGATTG AGCCAAGACT
  1561 TTCACCAAAA CTTTACTCTG TTTGATTCAG CAGTTCTATG GTTCCGTCAA GATAG

SEQ. ID. NO. 260
     1 MEGTNLTTYA AVFLDTLFLL FLSKLLRQRK LNLPPGPKPW PIIGNLNLIG NLPHRSIHEL
    61 SLKYGPVMQL QFGSFPVVVG SSVEMAKIFL KSMDINFVGR PKTAAGKYTT YNYSDITWSP
   121 YGPYWRQARR MCLTELFSTK RLDSYEYIRA EELHSLLHNL NKISGKPIVL KDYLTTLSLN
   181 VISRMVLGKR YLDESENSFV NPEEFKKMLD ELFLLNGVLN IGDSIPWIDF MDLQGYVKRM
   241 KVVSKKFDKF LEHVIDEHNI RRNGVENYVA KDMVDVLLQL ADDPKLEVKL ERHGVKAFTQ
   301 DMLAGGTESS AVTVEWAISE LLKKPEIFKK ATEELDRVIG QNRWVQEKDI PNLPYIEAIV
   361 KETMRLHPVA PMLVPRECRE DIKVAGYDVQ KGTRVLVSVW TIGRDPTLWD EPEVFKPERF
   421 HEKSIDVKGH DYELLPFGAG RRMCPGYSLG LKVIQASLAN LLHGFNWSLP DNMTPEDLNM
   481 DEIFGLSTPK KFPLATVIEP RLSPKLYSV
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FIG. 131

NAME D218A-AC2
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 261

```
   1 CTTCTTCCTT CCTAACTAAA AATGGAGATT CAGTTTTCTA ACTTAGTTGC ATTCTTGCTC
  61 TTTCTCTCCA GCATCTTTCT TGTATTCAAA AAATGGAAAA CCAGAAAACT AAATTTGCCT
 121 CCTGGTCCAT GGAAATTACC TTTTATTGGA AGTTTACACC ATTTGGCTGT GGCAGGTCCA
 181 CTTCCTCACC ATGGCCTAAA AAATTTAGCC AAACGCTATG GTCCTCTTAT GCATTTACAA
 241 CTTGGACAAA TTCCTACACT CGTCATATCA TCACCTCAAA TGGCAAAAGA AGTACTAAAA
 301 ACTCACGACC TCGCTTTTGC CACTAGACCA AAGCTTGTCG TGGCCGACAT CATTCACTAC
 361 GACAGCACGG ACATAGCACT TTCGCCATAC GGTGAATACT GGAGACAAAT TCGTAAAATT
 421 TGCATATTGG AACTCTTGAG TGCCAAGATG GTCAAGTTTT TTAGCTCGAT TCGCCAAGAT
 481 GAGCTCTCGA AGATGGTTTC ATCTATACGA ACGACGCCCA ATCTTCCAGT CAATCTTACC
 541 GACAAGATTT TTTGGTTTAC GAGTTCGGTA ATTTGTAGAT CAGCTTTAGG GAAGATATGT
 601 GGTGACCAAG ACAAATTGAT CATTTTTATG AGGGAAATAA TATCATTGGC AGGTGGATTT
 661 AGTATTGCTG ATTTTTTCCC TACATGGAAA ATGATTCATG ATATTGATGG TTCAAAATCT
 721 AAACTGGTGA AGGCACATCG TAAGATTGAT GAAATTTTGG AAAATGTGGT AAATGAGCAC
 781 AAACAGAATC GAGCAGATGG TAAAAAGGGT AATGGTGAAT TTGGTGGAGA AGATCTGATT
 841 GATGTTTTGT TAAGAGTTAG AGAAAGTGGA GAAGTTCAAA TTCCAATCAC AGATGACAAT
 901 ATCAAATCAA TATTAATCGA CATGTTCTCT GCCGGATCGG AAACATCATC GACAACTATA
 961 ATTTGGGCAT TAGCTGAAAT GATGAAGAAA CCAAGTGTTT TAGCAAAGGC ACAAGCTGAA
1021 GTGAGCCAAG CTTTGAAGGG GAAGAAAATT AGTTTTCAAG AGATTGATAT TGATAAGCTA
1081 AAGTATTTGA AGTTAGTGAT CAAAGAAACT TTAAGAATGC ACCCTCCAAT TCCTCTGTTA
1141 GTCCCTAGAG AATGTATGGA AGATACAAAG ATTGATGGTT ACAATATACC TTTCAAAACA
1201 AGAGTCATTG TTAATGCATG GGCAATTGGA CGAGATCCTC AAAGTTGGGA TGATCCTGAA
1261 AGCTTTACGC CAGAGAGATT TGAGAATAAT TCTATTGATT TTCTTGGAAA TCATCATCAA
1321 TTTATTCCAT TTGGTGCAGG AAGAAGGATT TGTCCTGGAA TGCTATTTGG TTTAGCTAAT
1381 GTTGGACAAC CTTTAGCTCA GTTACTTTAT CACTTCGATT GGAAACTCCC TAATGGACAA
1441 ACTCACCAAA ATTTCGACAT GACTGAGTCA CCTGGAATTT CTGCTACAAG AAAGGATGAT
1501 CTTATTTTGA TTGCCACTCC TGCTCATTCT TGATTAAGTA TTGCTGCTTT TCTATTGGAG
1561 AATTTTCAAA ATTCATCCAC AATATATAGT GTTTGCTAGA GTTGGTTAGC
```

SEQ. ID. NO. 262

```
   1 MEIQFSNLVA FLLFLSSIFL VFKKWKTRKL NLPPGPWKLP FIGSLHHLAV AGPLPHHGLK
  61 NLAKRYGPLM HLQLGQIPTL VISSPQMAKE VLKTHDLAFA TRPKLVVADI IHYDSTDIAL
 121 SPYGEYWRQI RKICILELLS AKMVKFFSSI RQDELSKMVS SIRTTPNLPV NLTDKIFWFT
 181 SSVICRSALG KICGDQDKLI IFMREIISLA GGFSIADFFP TWKMIHDIDG SKSKLVKAHR
 241 KIDEILENVV NEHKQNRADG KKGNGEFGGE DLIDVLLRVR ESGEVQIPIT DDNIKSILID
 301 MFSAGSETSS TTIIWALAEM MKKPSVLAKA QAEVSQALKG KKISFQEIDI DKLKYLKLVI
 361 KETLRMHPPI PLLVPRECME DTKIDGYNIP FKTRVIVNAW AIGRDPQSWD DPESFTPERF
 421 ENNSIDFLGN HHQFIPFGAG RRICPGMLFG LANVGQPLAQ LLYHFDWKLP NGQTHQNFDM
 481 TESPGISATR KDDLILIATP AHS
```

FIG. 132

NAME D210-BD4
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 263

```
   1 CTTTCATCAT ATGGCATGAA ATGGGAAATG CTCACAACAG CAAAATTGCA GCAATCTGTT
  61 TGATAATTTT CTTGGTATAT AAAGCATGGG AATTGTTGAA GTGGATATGG ATTAAGCCAA
 121 AGAAACTGGA GAGTTGCCTC AGAAAACAGG GACTCAAAGG AAATtCCTAC GGGCTATTCT
 181 ATGGAGATAT GAAAGAATtG TCCAAAAGTC TCAAGGAAAT CAATTCAAAG CCCATCATCA
 241 ATCTATCAAA TGAAGTAGCC CCAAGAATCA TTCCTTATtA TCTTGAAATC ATCCAAAAAT
 301 ATGGTAAAAG ATGTTTTGTT TGGCAAGGAC CAACCCCCGC AATATTAATA ACAGAGCCAG
 361 AATTAATAAA GGAGATATTT GGTAAGAACT ATGTTTTTCA GAAGCCTAAT AATCCCAACC
 421 CACTGACCAA GTTATTGGCT CGAGGTGTTG TAAGCTACGA GGAAGAAAAA TGGGCAAAAC
 481 ACAGAAAGAT CTTAAATCCT GCCTTTCATA TGGAGAAGTT GAAGCATATG CTACCAGCAT
 541 TTTACTTGAG CTGTAGTGAG ATGCTGAACA AATGGGAGGA GATTATCCCA GTAAAAGAAT
 601 CAAATGAGTT GGACATTTGG CCTCATCTTC AAAGAATGAC AAGTGATGTG ATTTCTCGTG
 661 CTGCCTTTGG TAGTAGCTAC GAAGAAGGAA GAAGAATATT TGAACTTCAA GAAGAACAAG
 721 CTGAGTATCT AACGAAGACA TTCAATTCAG TTTATATCCC AGGTTCCAGA TTTTTTCCCA
 781 ATAAAATGAA CAAAAGAATG AAAGAATGTG AAAAGGAAGT ACGAGAAACA ATTACGTGTC
 841 TAATTGACAA CAGATTAAAG GCAAAAGAAG AAGGCAATGG CAAGGCCCTC AATGATGACC
 901 TATTGGGTAT ATTATTAGAG TCAAATTCTA TAGAAATTGA AGAACATGGT AACAAGAAGT
 961 TTGGAATGAG TATACCTGAA GTAATTGAAG AGTGCAAATT ATTCTATTTT GCTGGCCAAG
1021 AGACTACATC AGTATTGCTT GTGTGGACAC TGATTTTGTT AGGGAGAAAt cCAGAATGGC
1081 AGGAACGTGC TAGAGAGGAA GTTTTTCAAG CCTTTGGAAG TGATAAACCA ACTTTTGACG
1141 AATTATATCG CTTGAAAATT GTGACGATGA TTTTGTACGA GTCTTTAAGG TTATATCCAC
1201 CAATAGCAAC TCGTACTCGA AGGACTAATG AAGAAACAAA ATTAGGGGAA CTAGATTTAC
1261 CAAAGGGTGC ACTGCTCTTT ATACCAACAA TCTTATTACA TCTTGACAGG GAAATTTGGG
1321 GTGAAGATGC AGATGAGTTC AATCCGGAGA GATTTAGCGA AGGGGTGGCA AAGGCAACAA
1381 AGGGGAAAAT GACATATTTT CCATTTGGTG CAGGACCGCG AAAATGCATT GGGCAAAACT
1441 TCGCGATTTT GGAAGCAAAA ATGGCTATAG CTATGATTCT ACAACGCTTC TCCTTCGAGC
1501 TCTCTCCATC TTATACACAC TCTCCATACA CTGTGGTCAC TTTGAAACCC AAATATGGTG
1561 CTCCCCTAAT AATGCACAGG CTGTAGTCCT GTGAGAATAT GCTATCCGAG G
```

SEQ. ID. NO. 264

```
   1 MGNAHNSKIA AICLIIFLVY KAWELLKWIW IKPKKLESCL RKQGLKGNSY GLFYGDMKEL
  61 SKSLKEINSK PIINLSNEVA PRIIPYYLEI IQKYGKRCFV WQGPTPAILI TEPELIKEIF
 121 GKNYVFQKPN NPNPLTKLLA RGVVSYEEEK WAKHRKILNP AFHMEKLKHM LPAFYLSCSE
 181 MLNKWEEIIP VKESNELDIW PHLQRMTSDV ISRAAFGSSY EEGRRIFELQ EEQAEYLTKT
 241 FNSVYIPGSR FFPNKMNKRM KECEKEVRET ITCLIDNRLK AKEEGNGKAL NDDLLGILLE
 301 SNSIEIEEHG NKKFGMSIPE VIEECKLFYF AGQETTSVLL VWTLILLGRN PEWQERAREE
 361 VFQAFGSDKP TFDELYRLKI VTMILYESLR LYPPIATRTR RTNEETKLGE LDLPKGALLF
 421 IPTILLHLDR EIWGEDADEF NPERFSEGVA KATKGKMTYF PFGAGPRKCI GQNFAILEAK
 481 MAIAMILQRF SFELSPSYTH SPYTVVTLKP KYGAPLIMHR L
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FIG. 133

NAME D233-AG7
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 265

```
   1 CTCATTATCC ATCACCTAAA ATGGAGAATT CTTGGGTTTT TCTAGCCTTG GCAGGGCTAT
  61 CTGCATTAGC TTTTCTCTGT AAAATAATCA CCTGTCGAAG ACCGGTTAAC CGGAAAATAC
 121 CACCAGGTCC AAAACCATGG CCCATCATTG GCAATTTGAA CCTACTTGGT CCTATACCAC
 181 ATCAATCTTT TGACTTGCTT TCCAAAAAAT ATGGAGAGTT GATGCTGCTG AAATTTGGCT
 241 CCAGGCCAGT TCTTGTTGCT TCATCTGCTG AAATGGCAAA ACAGTTTTTA AAAGTACATG
 301 ATGCTAATTT CGCCTCCCGT CCTATGCTAG CTGGTGGAAA GTATACAAGC TATAACTATT
 361 GTGACATGAC ATGGGCACCC TATGGTCCCT ATTGGCGCCA AGCACGACGA ATTTACCTTA
 421 ACCAGATATT TACTCCGAAA AGGCTAGACT CGTTCGAGTA CATTCGTGTT GAAGAAAGGC
 481 AGGCCTTGAT TTCCCAGCTG AATTCCCTTG CTGGAAAGCC ATTTTTTCTC AAAGACCATT
 541 TGTCGCGATT TAGCCTCTGC AGCATGACAA GGATGGTTTT GAGCAACAAG TATTTTGGTG
 601 AATCAACAGT TAGAGTAGAA GATTTGCAGT ACCTGGTAGA TCAATGGTTC TTACTTAATG
 661 GTGCTTTCAA CATTGGAGAT TGGATTCCAT GGCTCAGCTT CTTGGACCTA CAAGGCTATG
 721 TGAAACAAAT GAAGGCTTTG AAAAGAACTT TTGATAAGTT CCACAACATT GTGCTAGATG
 781 ATCACAGGGC TAAGAAGAAT GCAGAGAAGA ACTTTGTCCC AAAAGACATG GTTGATGTCT
 841 TGTTGAAGAT GGCTGAAGAT CCTAATCTGG AAGTCAAACT CACTAATGAC TGTGTCAAAG
 901 GGTTAATGCA GGATTTACTA ACTGGAGGAA CAGATAGCTT AACAGCAGCA GTGCAATGGG
 961 CATTTCAAGA ACTTCTTAGA CAGCCAAGGG TTATTGAGAA GGCAACCGAA GAGCTTGACC
1021 GGATTGTCGG GAAAGAGAGA TGGGTAGAAG AGAAAGATTG CTCGCAGCTA TCTTACGTTG
1081 AAGCAATCCT CAAGGAAACA CTAAGGTTAC ATCCTCTAGG AACTATGCTA GCACCGCATT
1141 GTGCTATAGA AGATTGTAAC GTGGCTGGTT ATGACATACA GAAAGGAACG ACCTTTCTGG
1201 TGAATGTTTG GACCATTGGA AGGGACCCAA AATACTGGGA TAGAGCACAA GAGTTTCTCC
1261 CCGAGAGATT TTTAGAGAAC GACATTGATA TGGACGGACA TAACTTTGCT TTCTTGCCAT
1321 TTGGCTCGGG GCGAAGGAGG TGCCCTGGCT ATAGCCTTGG ACTTAAGGTT ATCCGAGTAA
1381 CATTAGCCAA CATGTTGCAT GGATTCAACT GGAAATTACC TGAAGGTATG AAGCCAGAAG
1441 ATATAAGTGT GGAAGAACAT TATGGGCTCA CTACACATCC TAAGTTTCCT GTTCCTGTGA
1501 TCTTGGAATC TAGACTTTCT TCAGATCTCT ATTCCCCCAT CACTTAATCC TAAGTGCTTC
1561 CTATTATAGC
```

SEQ. ID. NO. 266

```
   1 MENSWVFLAL AGLSALAFLC KIITCRRPVN RKIPPGPKPW PIIGNLNLLG PIPHQSFDLL
  61 SKKYGELMLL KFGSRPVLVA SSAEMAKQFL KVHDANFASR PMLAGGKYTS YNYCDMTWAP
 121 YGPYWRQARR IYLNQIFTPK RLDSFEYIRV EERQALISQL NSLAGKPFFL KDHLSRFSLC
 181 SMTRMVLSNK YFGESTVRVE DLQYLVDQWF LLNGAFNIGD WIPWLSFLDL QGYVKQMKAL
 241 KRTFDKFHNI VLDDHRAKKN AEKNFVPKDM VDVLLKMAED PNLEVKLTND CVKGLMQDLL
 301 TGGTDSLTAA VQWAFQELLR QPRVIEKATE ELDRIVGKER WVEEKDCSQL SYVEAILKET
 361 LRLHPLGTML APHCAIEDCN VAGYDIQKGT TFLVNVWTIG RDPKYWDRAQ EFLPERFLEN
 421 DIDMDGHNFA FLPFGSGRRR CPGYSLGLKV IRVTLANMLH GFNWKLPEGM KPEDISVEEH
 481 YGLTTHPKFP VPVILESRLS SDLYSPIT
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FIG. 134

NAME D257-AE4
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 267

```
   1 CACATTGAGT CCTCTCCCAA ATCACTGATT CACCACCAAA AGTACCAACA ATTCAATGGA
  61 AGGTACAAAC TTGACTACAT ATGCAGCAGT ATTTCTTGAT ACTCTGTTTC TTTTGTTCCT
 121 TTCCAAACTT CTTCGCCAGA GGAAACTCAA TTTACCTCCA GGCCCAAAAC CATGGCCGAT
 181 CATCGGAAAC TTAAACCTTA TTGGCAATCT TCCTCATCGC TCAATCCACG AACTCTCCCT
 241 CAAGTACGGA CCCGTTATGC AACTCCAATT CGGGTCTTTC CCCGTTGTAG TTGGATCCTC
 301 CGTCGAAATG GCTAAGATTT TCCTCAAATC CATGGATATT AACTTTGTAG GCAGGCCTAA
 361 AACGGCTGCC GGAAAATACA CAACGTACAA TTATTCCGAT ATTACATGGT CTCCTTACGG
 421 ACCATATTGG CGCCAGGCAC GTAGGATGTG CCTAACGGAA TTATTCAGCA CGAAACGTCT
 481 CGATTCATAC GAGTATATTC GGGCTGAGGA GTTGCATTCT CTTCTCCATA ATTTGAACAA
 541 AATATCAGGG AAACCAATTG TGTTGAAAGA TTATTTGACG ACGTTGAGTT TAAATGTTAT
 601 TAGCAGGATG GTACTGGGGA AAAGGTATTT GGACGAATCC GAGAACTCGT TCGTGAATCC
 661 TGAGGAATTT AAGAAGATGT TGGACGAATT GTTTTTGCTA AATGGTGTAC TTAATATTGG
 721 AGATTCAATT CCATGGATTG ATTTCATGGA TTTGCAAGGT TATGTTAAGA GGATGAAAGT
 781 AGTGAGCAAG AAATTCGACA AGTTTTTAGA GCATGTTATT GATGAGCATA ACATTAGGAG
 841 AAATGGAGTG GAGAATTATG TTGCTAAGGA TATGGTGGAT GTTTTGTTGC AGCTTGCTGA
 901 TGATCCGAAG TTGGAAGTTA AGCTGGAGAG ACATGGAGTC AAAGCATTCA CTCAGGATAT
 961 GCTGGCTGGT GGAACCGAGA GTTCAGCAGT GACAGTGGAG TGGGCAATTT CAGAGCTGCT
1021 AAAGAAGCCG GAGATTTTCA AAAAGGCTAC AGAAGAATTG GATCGAGTAA TTGGGCAGAA
1081 TAGATGGGTA CAAGAAAAGG ACATTCCAAA TCATCcTTAC ATAGAGGCAA TAGTCAAAGA
1141 GACTATGCGA CTGCACCCCG TGGCACCAAT GTTGGTGCCA CGTGAGTGTC GAGAAGATAT
1201 TAAGGTAGCA GGCTACGACG TTCAGAAAGG AACTAGGGTT CTCGTGAGTG TATGGACTAT
1261 TGGAAGAGAC CCTACATTGT GGGACGAGCC TGAGGTGTTC AAGCCGGAGA GATTCCATGA
1321 AAAGTCCATA GATGTTAAAG GACATGATTA TGAGCTTTTG CCATTTGGAG CGGGGAGAAG
1381 AATGTGCCCG GGTTATAGCT TGGGGCTCAA GGTGATTCAA GCTAGCTTAG CTAATCTTCT
1441 ACATGGATTT AACTGGTCAT TGCCTGATAA TATGACTCCT GAGGACCTCA ACATGGATGA
1501 GATTTTTGGG CTCTCTACAC CTAAAAAATT TCCACTTGCT ACTGTGATTG AGCCAAGACT
1561 TTCACCAAAA CTTTACTCTG TTTGATTCAG CAGTTCTATG GATCCGTCAA GATAGAC
```

SEQ. ID. NO. 268

```
   1 MEGTNLTTYA AVFLDTLFLL FLSKLLRQRK LNLPPGPKPW PIIGNLNLIG NLPHRSIHEL
  61 SLKYGPVMQL QFGSFPVVVG SSVEMAKIFL KSMDINFVGR PKTAAGKYTT YNYSDITWSP
 121 YGPYWRQARR MCLTELFSTK RLDSYEYIRA EELHSLLHNL NKISGKPIVL KDYLTTLSLN
 181 VISRMVLGKR YLDESENSFV NPEEFKKMLD ELFLLNGVLN IGDSIPWIDF MDLQGYVKRM
 241 KVVSKKFDKF LEHVIDEHNI RRNGVENYVA KDMVDVLLQL ADDPKLEVKL ERHGVKAFTQ
 301 DMLAGGTESS AVTVEWAISE LLKKPEIFKK ATEELDRVIG QNRWVQEKDI PNHPYIEAIV
 361 KETMRLHPVA PMLVPRECRE DIKVAGYDVQ KGTRVLVSVW TIGRDPTLWD EPEVFKPERF
 421 HEKSIDVKGH DYELLPFGAG RRMCPGYSLG LKVIQASLAN LLHGFNWSLP DNMTPEDLNM
 481 DEIFGLSTPK KFPLATVIEP RLSPKLYSV
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FIG. 135

NAME D268-AE2
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 269

```
   1 TGCAATATAG TTTTCCTAGT CAGTTCTAGC CTCCTTTTCC TTAGAAATAA TGGATTATCA
  61 TATTTCTTTC CATTTTCAAG CTCTTTTAGG GCTTTTAGCC TTTGTGTTCT TGTCTATTAT
 121 CTTATGGAGA AGAACACTCA CTTCAAGAAA ATTAGCCCCT GAAATCCCAG GGGCATGGCC
 181 TATTATAGGC CATCTTCGTC AGCTGAGTGG TACTGATAAG AATATCCCAT TTCCCCGAAT
 241 ATTGGGCGCT TTGGCAGATA AATATGGACC TGTCTTCACA CTGAGAATAG GGATGTACCC
 301 CTATTTGATT GTCAACAATT GGGAAGCAGC TAAGGATTGT CTCACAACGC ATGATAAGGA
 361 CTTCGCTGCC CGACCAACTT CTATGGCTGG TGAAAGCATC GGGTACAAGT ATGCGAGGTT
 421 TACTTATGCT AATTTTGGTC CTTATTATAA CCAAGTGCGC AAACTAGCCC TACAACATGT
 481 ACTCTCGAGT ACTAAACTCG AGAAAATGAA ACACATACGT GTTTCTGAAT TGGAAACTAG
 541 CATCAAAGAA TTATATTCTT TGACGCTGGG CAAAAACAAC ATGCAAAAAG TGAATATAAG
 601 TAAATGGTTT GAACAATTGA CTTTAAACAT AATCGTGAAG ACAATTTGTG GCAAGAGATA
 661 TAGCAACATA GAGGAGGATG AAGAGGCACA ACGTTTCAGA AAGGCATTTA AGGGCATCAT
 721 GTTTGTTGTA GGGCAAATTG TTTTATATGA CGCAATTCCA TTCCCATTGT TCAAATACTT
 781 TGATTTCCAA GGTCATATAC AATTGATGAA CAAAATTTAT AAAGACTTAG ATTCTATTCT
 841 TCAAGGATGG TTGGATGATC ATATGATGAA CAAGGATGTA AACAATAAGG ATCAAGATGC
 901 CATAGATGCC ATGCTTAAGG TAACACAACT TAATGAATTC AAAGCCTATG GTTTTTCTCA
 961 GGCCACTGTG ATCAAGTCGA CAGTCTTGAG TTTGATCTTA GATGGAAATG ACACAACCGC
1021 TGTTCATTTG ATATGGGTAA TGTCCTTATT ACTGAACAAT CCACATGTTA TGAAACAAGG
1081 CCAAGAAGAG ATAGACATGA AAGTGGGTAA AGAGAGGTGG ATTGAAGATA CTGACATAAA
1141 AAATTTAGTG TACCTTCAGG CTATCGTTAA AGAGACATTG CGCTTGTATC CACCTGTTCC
1201 TTTTCTTTTA CCACACGAAG CAGTGCAAGA TTGTAAAGTG ACTGGTTACC ACATTCCTAA
1261 AGGTACTCGT CTATATATCA ATGCGTGGAA AGTACATCGC GATTCTGAAA TTTGGTCAGA
1321 GCCCGAAAAG TTTATGCCCA ATAGATTCTT GACTAGCAAA GCAAATATAG ATGCTCGCGG
1381 TCAAAATTTT GAATTTATAC CGTTTGGTTC TGGGAGACGG TCATGTCCAG GGTTAGGTTT
1441 TGCGACTTTA GTGACACATC TGACTTTTGG TCGCTTGCTT CAAGGTTTTG ATTTTAGTAA
1501 GCCATCAAAC ACGCCAATTG ACATGACAGA AGGCGTAGGC GTTACTTTGC CTAAGGTTAA
1561 TCAAGTTGAA GTTCTAATTA CCCCTCGTTT ACCTTCTAAG CTTTATTTAT TTTGAAAGTG
1621 CAAATCATCA ATCATGGGTT GAGTAATTAG TGATACT
```

SEQ. ID. NO. 270

```
   1 MDYHISFHFQ ALLGLLAFVF LSIILWRRTL TSRKLAPEIP GAWPIIGHLR QLSGTDKNIP
  61 FPRILGALAD KYGPVFTLRI GMYPYLIVNN WEAAKDCLTT HDKDFAARPT SMAGESIGYK
 121 YARFTYANFG PYYNQVRKLA LQHVLSSTKL EKMKHIRVSE LETSIKELYS LTLGKNNMQK
 181 VNISKWFEQL TLNIIVKTIC GKRYSNIEED EEAQRFRKAF KGIMFVVGQI VLYDAIPFPL
 241 FKYFDFQGHI QLMNKIYKDL DSILQGWLDD HMMNKDVNNK DQDAIDAMLK VTQLNEFKAY
 301 GFSQATVIKS TVLSLILDGN DTTAVHLIWV MSLLLNNPHV MKQGQEEIDM KVGKERWIED
 361 TDIKNLVYLQ AIVKETLRLY PPVPFLLPHE AVQDCKVTGY HIPKGTRLYI NAWKVHRDSE
 421 IWSEPEKFMP NRFLTSKANI DARGQNFEFI PFGSGRRSCP GLGFATLVTH LTFGRLLQGF
 481 DFSKPSNTPI DMTEGVGVTL PKVNQVEVLI TPRLPSKLYL F
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FIG. 136

NAME D283-AC1
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 271

```
   1 AGAGAGTGAA AATGGACGCA CTACTTCAAA TGACAGTAAC AGCATCTTGT GCTGCCATAG
  61 TAATTACTCT GCTGGTGTGT ATATGGAGAG TGCTGAACTG GATTTGGTTC AGACCAAAGA
 121 AATTGGAGTT GTTGTTGAGA AAACAAGGTT TGGAAGGAAA TTCTTACAAG GTTTTGTATG
 181 GGACATGAA AGAGTTTTCT GGGATGATTA AGGAAGCATA CTCAAAGCCT ATGAGTCTAT
 241 CTGATGATGT AGCACCAAGA CTGATGCCTT TCTTTCTTGA AACCATCAAA AAATATGGAA
 301 AAAGATCCTT TATATGGTTT GGTCCAAGAC CACTAGTATT GATTATGGAT CCTGAGCTTA
 361 TAAAGGAAGT ACTCTCAAAA ATCCATCTGT ATCAAAAGCC TGGTGGAAAT CCATTAGCAA
 421 CACTATTGGT ACAAGGAATA GCAACCTATG AGGAAGACAA ATGGGCCAAA CATAGAAAAA
 481 TCATCAATCC CGCTTTCCAT CTAGAGAAGC TAAAGCTTAT GCTTCCAGCA TTTCGCTTAA
 541 GCTGTAGTGA GATGCTGAGC AAATGGGAAG ACATTGTTTC AGCTGATAGC TCACATGAGA
 601 TAGATGTATG GTCTCACCTT GAGCAATTGA CTTGCGATGT GATCTCTCGG ACAGCTTTTG
 661 GCAGTAGTTA TGAAGAAGGT AGAAAGATTT TTGAACTTCA AAAGGAACAA GCTCAGTATC
 721 TTGTGGAAGT TTTCCGCTCC GTTTATATCC CAGGAAGGAG ATTTTTGCCA ACAAAGAGGA
 781 ATAGAAGAAT GAAGGAAATA AAAAAGGATG TCCGGGCATC AATTAAAGGT ATTATTGATA
 841 AAAGATTGAA GGCAATGAAA GCAGGGGACA CCAATAATGA GGATCTATTG GGTATATTAC
 901 TGGAATCGaA TATTAAAGAA ATTGAACAGC ACGGAAACAA GGATTTTGGA ATGAGCATTG
 961 AAGAAGTCAT TGAAGAATGC AAGTTATTCT ATTTTGCTGG CCAAGAAACT ACATCAGTGT
1021 TACTCCTATG GTCTCTAGTG TTGTTGAGCA GGTATCAAGA TTGGCAGGCA CGGGCCAGAG
1081 AAGAAATCTT GCAAGTCTTT GGCAGTCGAA AACCAGATTT TGACGGATTA AATCATCTAA
1141 AAATTGTGAC AATGATCTTG TACGAGTCTT TAAGGCTGTA TCCCTCACTA ATAACACTTA
1201 CCCGCCGGTG TAATGAAGAC ATTGTATTAG GAGAACTATC TCTACCAGCT GGTGTTCTAG
1261 TCTCTTTGCC ATTGATTTTG TTGCATCATG ATGAAGAGAT ATGGGGTGAA GATGCAAAGG
1321 AGTTCAAACC AGAGAGATTT AGAGAAGGAA TATCAAGTGC AACAAAGGGT CAACTCACAT
1381 ATTTTCCATT TAGCTGGGGT CCTAGAATAT GTATTGGACA AAATTTTGCC ATGTTAGAAG
1441 CAAAGATGGC TCTGTCTATG ATCCTGCAAC GCTTCTCTTT TGAACTGTCT CCGTCTTATG
1501 CACATGCCCC TCGGTCCATA ATAACCGTTC AGCCTCAGTA TGGTGCTCCA CTTATTTTCC
1561 ACAAACTATA ATTTTGGTAC TTCTACTAAT ATTTTAGGGT TTATTCAGAC TCAAAAAAAA
```

SEQ. ID. NO. 272

```
   1 MTVTASCAAI VITLLVCIWR VLNWIWFRPK KLELLLRKQG LEGNSYKVLY GDMKEFSGMI
  61 KEAYSKPMSL SDDVAPRLMP FFLETIKKYG KRSFIWFGPR PLVLIMDPEL IKEVLSKIHL
 121 YQKPGGNPLA TLLVQGIATY EEDKWAKHRK IINPAFHLEK LKLMLPAFRL SCSEMLSKWE
 181 DIVSADSSHE IDVWSHLEQL TCDVISRTAF GSSYEEGRKI FELQKEQAQY LVEVFRSVYI
 241 PGRRFLPTKR NRRMKEIKKD VRASIKGIID KRLKAMKAGD TNNEDLLGIL LESNIKEIEQ
 301 HGNKDFGMSI EEVIEECKLF YFAGQETTSV LLLWSLVLLS RYQDWQARAR EEILQVFGSR
 361 KPDFDGLNHL KIVTMILYES LRLYPSLITL TRRCNEDIVL GELSLPAGVL VSLPLILLHH
 421 DEEIWGEDAK EFKPERFREG ISSATKGQLT YFPFSWGPRI CIGQNFAMLE AKMALSMILQ
 481 RFSFELSPSY AHAPRSIITV QPQYGAPLIF HKL
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FIG. 137

NAME D244-AB6
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 273

```
   1 TGCAATATAG TTTTCCTAGT CAGTTCTAGC CTCCTTTTCC TTAGAAATAA TGGATTATCA
  61 TATTTCTTTC CATTTTCAAG CTCTTTTAGG GCTTTTAGCC TTTGTGTTCT TGTCTATTAT
 121 CTTATGGAGA AGAACACTCA CTTCAAGAAA ATTAGCCCCT GAAATCCCAG GGGCATGGCC
 181 TATTATAGGC CATCTTCGTC AGCTGAGTGG TACTGATAAG AATATCCCAT TTCCCCGAAT
 241 ATTGGGCGCT TTGGCAGATA AATATGGACC TGTCTTCACA CTGAGAATAG GGATGTACCC
 301 CTATTTGATT GTCAACAATT GGGAAGCAGC TAAGGATTGT CTCACAACGC ATGATAAGGA
 361 CTTggCTGCC CGACCAACTT CTATGGCTGG TGAAAGCATC GGGTACAAGT ATGCGAGGTT
 421 TACTTATGCT AATTTTGGTC CTTATTATAA CCAAGTGCGC AAACTAGCCC TACAACATGT
 481 ACTCTCGAGT ACTAAACTCG AGAAAATGAA ACACATACGT GTTTCTGAAT TGGAAACTAG
 541 CATCAAAGAA TTATATTCTT TGACGCTGGG CAAAAACAAC ATGCAAAAAG TGAATATAAG
 601 TAAATGGTTT GAACAATTGA CTTTAAACAT AATCGTGAAG ACAATTTGTG GCAAGAGATA
 661 TAGCAACATA GAGGAGGATG AAGAGGCACA ACGTTTCAGA AAGGCATTTA AGGGCATCAT
 721 GTTTGTTGTA GGGCAAATTG TTTTATATGA CGCAATTCCA TTCCCATTGT TCAAATACTT
 781 TGATTTCCAA GGTCATATAC AATTGATGAA CAAAATTTAT AAAGACTTAG ATTCTATTCT
 841 TCAAGGATGG TTGGATGATC ATATGATGAA CAAGGATGTA AACAATAAGG ATCAAGATGC
 901 CATAGATGCC ATGCTTAAGG TAACACAACT TAATGAATTC AAAGCCTATG GTTTTTCTCA
 961 GGCCACTGTG ATCAAGTCGA CAGTCTTGAG TTTGATCTTA GATGGAAATG ACACAACCGC
1021 TGTTCATTTG ATATGGGTAA TGTCCTTATT ACTGAACAAT CCACATGTTA TGAAACAAGG
1081 CCAAGAAGAG ATAGACATGA AAGTGGGTAA AGAGAGGTGG ATTGAAGATA CTGACATAAA
1141 AAATTTAGTG TACCTTCAGG CTATCGTTAA AGAGACATTG CGCTTGTATC CACCTGTTCC
1201 TTTTCTTTTA CCACACGAAG CAGTGCAAGA TTGTAAAGTG ACTGGTTACC ACATTCCTAA
1261 AGGTACTCGT CTATATATCA ATGCGTGGAA AGTACATCGC GATCCTGAAA TTTGGTCAGA
1321 GCCCGAAAAG TTTATGCCCA ATAGATTCTT GACTAGCAAA GCAAATATAG ATGCTCGCGG
1381 TCAAAATTTT GAATTTATAC CGTTTGGTTC TGGGAGACGG TCATGTCCAG GGATAGGTTT
1441 TGCGACTTTA GTGACACATC TGACTTTTGG TCGCTTGCTT CAAGGTTTTG ATTTTAGTAA
1501 GCCATCAAAC ACGCCAATTG ACATGACAGA AGGCGTAGGC GTTACTTTGC CTAAGGTTAA
1561 TCAAGTTGAA GTTCTAATTA CCCCTCGTTT ACCTTCTAAG CTTTATTTAT TTTGAAGGTG
1621 CAAATCATCA ATCATGGCTT GAGTAATTAG TTATACTTTA ATATGTTTCT C
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SEQ. ID. NO. 274

```
   1 MDYHISFHFQ ALLGLLAFVF LSIILWRRTL TSRKLAPEIP GAWPIIGHLR QLSGTDKNIP
  61 FPRILGALAD KYGPVFTLRI GMYPYLIVNN WEAAKDCLTT HDKDLAARPT SMAGESIGYK
 121 YARFTYANFG PYYNQVRKLA LQHVLSSTKL EKMKHIRVSE LETSIKELYS LTLGKNNMQK
 181 VNISKWFEQL TLNIIVKTIC GKRYSNIEED EEAQRFRKAF KGIMFVVGQI VLYDAIPFPL
 241 FKYFDFQGHI QLMNKIYKDL DSILQGWLDD HMMNKDVNNK DQDAIDAMLK VTQLNEFKAY
 301 GFSQATVIKS TVLSLILDGN DTTAVHLIWV MSLLLNNPHV MKQGQEEIDM KVGKERWIED
 361 TDIKNLVYLQ AIVKETLRLY PPVPFLLPHE AVQDCKVTGY HIPKGTRLYI NAWKVHRDPE
 421 IWSEPEKFMP NRFLTSKANI DARGQNFEFI PFGSGRRSCP GIGFATLVTH LTFGRLLQGF
 481 DFSKPSNTPI DMTEGVGVTL PKVNQVEVLI TPRLPSKLYL F
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FIG. 138

NAME D205-BE9
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 275

```
   1 TTTGATTCAA CCATGGAGAA CCAATACTCC TACTCATTCT CTTCCTACTT CTACTTAGCT
  61 ATAGTACTGT TTCTTCTTCC AATTTTGGTC AAATATTTCT TCCATCGGAG AAGAAATTTA
 121 CCTCCAAGTC CATTTTCTCT TCCAATAATT GGTCACCTTT ACCTTCTCAA GAAAACTCTC
 181 CATCTCACTC TAACATCCTT ATCAGCTAAA TATGGTCCTG TTTTATACCT CAAATTGGGC
 241 TCTATGCCTG TGATTGTTGT GTCCTCACCA TCTGCTGTTG AAGAATGTTT AACCAAGAAT
 301 GATATCATAT TCGCAAATAG GCCCAAGACC GTGGCTGGTG ACAAGTTTAC CTACAATTAT
 361 ACTGTTTATG TTTGGGCACC CTATGGCCAA CTTTGGAGAA TTCTTCGCCG ATTAACTGTC
 421 GTTGAACTCT TCTCTTCACA TAGCCTACAG AAAACTTCTA TCCTTAGAGA TCAAGAAGTT
 481 GCAATATTTA TCCGTTCGTT ATACAAATTC TCAAAGGATA GTAGCAAAAA AGTCGATTTG
 541 ACCAACTGGT CTTTTACTTT GGTTTTCAAT CTTATGACCA AAATTATTGC TGGGAGACAT
 601 ATTGTGAAGG AGGAAGATGC TGGCAAGGAA AAGGGCATTG AAATTATTGA AAAACTTAGA
 661 GGGACTTTCT TAGTAACTAC ATCATTCTTG AATATGTGTG ATTTCTTGCC AGTATTCAGG
 721 TGGGTTGGTT ACAAAGGGCA GGAGAAGAAG ATGGCCTCAA TTCACAATAG AAGAAATGAA
 781 TTCTTGAACA GCTTGCTTGA TGAATTTCGA CACAAGAAAA GTAGTGCTTC ACAATCTAAC
 841 ACAACTGTTG GAAACATGGA GAAGAAAACC ACACTGATTG AAAAGCTCTT GTCTCTTCAA
 901 GAATCAGAGC CTGAATTCTA CACTGATGAT ATCATCAAAA GTATTATGCT GGTAGTTTTT
 961 GTTGCAGGAA CAGAGACCTC ATCAACAACC ATCCAATGGG TAATGAGGCT TCTTGTAGCT
1021 CACCCTGAGG CATTGTATAA GCTACGAGCT GACATTGACA GTAAAGTTGG GAATAAGCGC
1081 TTGCTGAATG AATCAGACCT CAACAAGCTT CCGTATTTGC ATTGTGTTGT TAATGAGACA
1141 ATGAGATTAT ACACTCCGAT ACCACTTTTA TTGCCTCATT ATTCAACTAA AGATTGTATT
1201 GTGGAAGGAT ATGATGTACC AAAACATACA ATGTTGTTTG TCAACGCTTG GGCCATTCAC
1261 AGGGATCCCA AGGTATGGGA GGAGCCTGAC AAGTTCAAGC CAGAGAGATT TGAGGCAACA
1321 GAAGGGGAAA CAGAAAGGTT CAATTACAAG CTTGTACCAT TTGGAATGGG GAGAAGAGCG
1381 TGCCCTGGAG CTGATATGGG GTTGCGAGCA GTTTCTTTGG CATTAGGTGC ACTTATTCAA
1441 TGCTTTGACT GGCAAATTGA GGAAGCGGAA AGCTTGGAGG AAAGCTATAA TTCTAGAATG
1501 ACTATGCAGA ACAAGCCTTT GAAGGTTGTC TGCACTCCAC GCGAAGATCT TGGCCAGCTT
1561 CTATCCCAAC TCTAAGGCAA TTTATCAATG CCAAACGTAA TCTTCATCTA CCACTATG
```

SEQ. ID. NO. 276

```
   1 MENQYSYSFS SYFYLAIVLF LLPILVKYFF HRRRNLPPSP FSLPIIGHLY LLKKTLHLTL
  61 TSLSAKYGPV LYLKLGSMPV IVVSSPSAVE ECLTKNDIIF ANRPKTVAGD KFTYNYTVYV
 121 WAPYGQLWRI LRRLTVVELF SSHSLQKTSI LRDQEVAIFI RSLYKFSKDS SKKVDLTNWS
 181 FTLVFNLMTK IIAGRHIVKE EDAGKEKGIE IIEKLRGTFL VTTSFLNMCD FLPVFRWVGY
 241 KGQEKKMASI HNRRNEFLNS LLDEFRHKKS SASQSNTTVG NMEKKTTLIE KLLSLQESEP
 301 EFYTDDIIKS IMLVVFVAGT ETSSTTIQWV MRLLVAHPEA LYKLRADIDS KVGNKRLLNE
 361 SDLNKLPYLH CVVNETMRLY TPIPLLLPHY STKDCIVEGY DVPKHTMLFV NAWAIHRDPK
 421 VWEEPDKFKP ERFEATEGET ERFNYKLVPF GMGRRACPGA DMGLRAVSLA LGALIQCFDW
 481 QIEEAESLEE SYNSRMTMQN KPLKVVCTPR EDLGQLLSQL
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FIG. 139

NAME D136-AF4
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 277

```
   1 CCTTTTTAAG ATGTATTTAA GATTTAAGAT TTAAGATGAA GCAACTGAGG TAAGTCCTTT
  61 CAAGGAGTAG TTGTCACTTC TGAGAATGGA GATGATGTAC AGCATAATAG CAGCAGCCAG
 121 TATTGCAATT ATCTTGGTAT ATACATGGAA AGTGTTGAAT TGGGCTTGGT TTGGGCCGAA
 181 GAAAATGGAG AAATGCTTAA GACAGAGGGG TCTCAAGGGA AATCCTTATA AGCTACTCTA
 241 TGGAGATCTA AACGAACTGA CAAAAAGCAT AATAGAAGCC AAGTCTAAGC CCATCAATTT
 301 CTCTGATGAT ATTGCTCAAA GGCTCATCCC TTTTTTTCTT GACGCCATCA ACAAAAATGG
 361 TAAAAACTCC TTCGTCTGGC TTGGACCGTA TCCAATAGTG TTGATCACGG ATCCTGAGCA
 421 TTTAAAGGAG ATTTTCACAA AGAATTATGT GTATCAAAAG CAAACTCATC CCAATCCATA
 481 CGCCAAGCTA TTAGCTCACG GTCTTGTCAG CCTTGAGGAA GACAAATGGG CCAAACACAG
 541 AAAAATCATT AGTCCTGCCT TCCATGTCGA GAAGCTAAAG CATATGCTGC CTGCATTTTA
 601 TCTGAGTTGT AGTGAAATGA TAAGCAAATG GGAGGAGGTT GTTCCAAAAG AAACATCATT
 661 CGAGCTCGAT GTATGGCCAG ACCTTCAAAT AATGACCAGT GAAGTCATTT CTCGCACTGC
 721 ATTTGGGAGT AGCTATGAAG AAGGAAGAAT AGTATTTGAA CTTCAGAAAG AACAAGCTGA
 781 GTATGTAATG GACATAGGAC GTTCAATTTA TATACCAGGA TCAAGGTTCT TGCCTACTAA
 841 AAGGAACAAA AGAATGCTGG AAATTGAAAA GCAAGTGCAA ACAACAATTA GGCGTATCAT
 901 CGACAAAAGA TTGAAGGCAA TGGAAGAAGG GGAGACTAGT AAAGATGACT TATTAGGCAT
 961 ATTACTTGAA TCCAATTTGA AAGAAATTGA ACTTCATGGA AGAAATGACT TGGGAATAAC
1021 AACGTCAGAA GTGATTGAAG AGTGCAAGTT ATTCTATTTT GCCGGCCAAG AGACCACTTC
1081 AGTGTTGCTT GTTTGGACAA TGATTTTGTT GTGCTTACAT CCAGAGTGGC AAGTACGTGC
1141 CAGAAAGGAA GTGTTGCAGA TCTTTGGAAA TGATAAACCA GATTTGGAAG GACTAAGTCG
1201 CTTGAAAATT GTAACAATGA TCTTGTACGA GACGTTACGC CTATTCCCCC CATTACCAGC
1261 ATTTGGTAGA AGGAACAAAG AAGAAGTCAA ATTAGGGGAG CTACATCTAC CGGCTGGAGT
1321 GTTACTCGTT ATACCAGCAA TCTTAGTACA TTATGATAAG GAAATATGGG GTGAAGATGC
1381 AAAGGAATTC AAACCAGAAA GATTCAGTGA AGGAGTGTCA AAGGCAACAA ATGGACAAGT
1441 CTCATTTATA CCATTTAGCT GGGGACCTCG TGTTTGCATT GGACAAAACT TCGCAATGAT
1501 GGAAGCAAAA ATGGCAGTAA CTATGATACT ACAAAAATTC TCCTTTGAAC TATCCCCTTC
1561 TTATACACAT GCTCCATTTG CAATTGTGAC TATTCATCCC CAGTATGGTG CTCCTCTGCT
1621 TATGCGCAGA CTTTAAAACA TATGTTGCTG ATATTTAAGA TCAGTGGCGT TTTATT
```

SEQ. ID. NO. 278

```
  1 MEMMYSIIAA ASIAIILVYT WKVLNWAWFG PKKMEKCLRQ RGLKGNPYKL LYGDLNELTK
 61 SIIEAKSKPI NFSDDIAQRL IPFFLDAINK NGKNSFVWLG PYPIVLITDP EHLKEIFTKN
121 YVYQKQTHPN PYAKLLAHGL VSLEEDKWAK HRKIISPAFH VEKLKHMLPA FYLSCSEMIS
181 KWEEVVPKET SFELDVWPDL QIMTSEVISR TAFGSSYEEG RIVFELQKEQ AEYVMDIGRS
241 IYIPGSRFLP TKRNKRMLEI EKQVQTTIRR IIDKRLKAME EGETSKDDLL GILLESNLKE
301 IELHGRNDLG ITTSEVIEEC KLFYFAGQET TSVLLVWTMI LLCLHPEWQV RARKEVLQIF
361 GNDKPDLEGL SRLKIVTMIL YETLRLFPPL PAFGRRNKEE VKLGELHLPA GVLLVIPAIL
421 VHYDKEIWGE DAKEFKPERF SEGVSKATNG QVSFIPFSWG PRVCIGQNFA MMEAKMAVTM
481 ILQKFSFELS PSYTHAPFAI VTIHPQYGAP LLMRRL
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FIG. 140

NAME D101-BA2
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 279

```
   1 CTAAATTTCA TATACCTTTA GTACTCTTGA AATTTTCAAA TAATGGTTTA TCTTCTTTCT
  61 CCCATAGAAG CCATTGTAGG ATTTGTAACC TTTTCATTTC TATTCTACTT TCTATGGACC
 121 AAAAAACAAT CAAAAATCTT AAACCCACTA CCTCCAAAAA TCCCAGGTGG ATGGCCAGTA
 181 ATCGGCCATC TCTTTTATTT CAAGAACAAT GGCGATGAAG ATCGCCATTT TTCTCAAAAA
 241 CTCGGTGACT TAGCTGACAA ATATGGTCCC GTCTTCACTT TCCGGTTAGG GTTTCGCCGT
 301 TTCTTGGCGG TGAGTAGTTA TGAAGCTATG AAAGAATGCT TCACTACCAA TGATATCCAT
 361 TTCGCCGATC GGCCATCTTT ACTCTACGGA GAATACCTTT GCTATAATAA TGCCATGCTT
 421 GCTGTTGCCA AATATGGCCC TTACTGGAAA AAAAATCGAA AGTTAGTCAA TCAAGAAGTT
 481 CTCTCCGTTA GTCGGCTCGA AAAATTCAAA CATGTTAGAT TTTCTATAAT TCAGAAAAAT
 541 ATTAAACAAT TGTATAATTG TGATTCACCA ATGGTGAAGA TAAACCTTAG TGATTGGATA
 601 GATAAATTGA CATTCGACAT CATTTTGAAA ATGGTTGTTG GGAAGAACTA TAATAATGGA
 661 CATGGAGAAA TACTCAAAGT TGCTTTTCAG AAATTCATGG TTCAAGCTAT GGAGATGGAG
 721 CTCTATGATG TTTTTCACAT TCCATTTTTC AAGTGGTTGG ATCTTACAGG GAATATTAAG
 781 GCTATGAAAC AAACTTTCAA AGACATTGAT AATATTATCC AAGGTTGGTT AGATGAGCAC
 841 ATTAAGAAGA GAGAAACAAA GGATGTTGGA GGTGAAAACG AACAAGATTT TATAGATGTG
 901 GTGCTTTCCA AGATGAGCGA CGAACATCTT GGCGAGGGTT ACTCTCATGA CACAACCATC
 961 AAAGCAACTG TATTCACTTT GGTCTTGGAT GCAACAGACA CACTTGCACT TCATATAAAG
1021 TGGGTAATGG CGTTAATGAT AAACAATAAG CATGTCATGA AGAAAGCACA AGAAGAGATG
1081 GACACAATTG TTGGTAGAGA TAGATGGGTA GAAGAGAGTG ATATCAAGAA TTTGGTGTAT
1141 CTCCAAGCAA TTGTTAAAGA AGTATTACGA TTACATCCAC CTGCACCTTT GTCAGTGCAA
1201 CACCTATCTG TGGAAGATTG TGTTGTCAAT GGGTACCATA TTCCTAAGGG GACTGCACTA
1261 CTTACCAATA TTATGAAACT ACAGCGAGAT CCTCAAACAT GGCCAAATCC TGATAAATTC
1321 GATCCAGAGA GATTCCTGAC GACTCATGCT ACTATTGACT ACCGCGGGCA GCACTATGAG
1381 TTGATCCCCT TTGGTACGGG GAGACGAGCT TGTCCCGCGA TGAATTATTC ATTGCAAGTG
1441 GAACACCTTT CAATTGCTCA TATGATCCAA GGTTTCAGTT TTGCAACTAC GACCAATGAG
1501 CCTTTGGATA TGAAACAAGG TGTGGGTTTA ACTTTACCAA AGAAGACTGA TGTTGAAGTT
1561 CTAATTACCC CTCGTTT
```

SEQ. ID. NO. 280

```
  1 MVYLLSPIEA IVGFVTFSFL FYFLWTKKQS KILNPLPPKI PGGWPVIGHL FYFKNNGDED
 61 RHFSQKLGDL ADKYGPVFTF RLGFRRFLAV SSYEAMKECF TTNDIHFADR PSLLYGEYLC
121 YNNAMLAVAK YGPYWKKNRK LVNQEVLSVS RLEKFKHVRF SIIQKNIKQL YNCDSPMVKI
181 NLSDWIDKLT FDIILKMVVG KNYNNGHGEI LKVAFQKFMV QAMEMELYDV FHIPFFKWLD
241 LTGNIKAMKQ TFKDIDNIIQ GWLDEHIKKR ETKDVGGENE QDFIDVVLSK MSDEHLGEGY
301 SHDTTIKATV FTLVLDATDT LALHIKWVMA LMINNKHVMK KAQEEMDTIV GRDRWVEESD
361 IKNLVYLQAI VKEVLRLHPP APLSVQHLSV EDCVVNGYHI PKGTALLTNI MKLQRDPQTW
421 PNPDKFDPER FLTTHATIDY RGQHYELIPF GTGRRACPAM NYSLQVEHLS IAHMIQGFSF
481 ATTTNEPLDM KQGVGLTLPK KTDVEVLITP R
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FIG. 141

NAME D130-AA1
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 281

1 CTTTTTCTCC CCAAAAAAGA GCTCATTTCC CTTGTCCCCA AAAATGGATC TTCTCTTACT
61 AGAGAAGACC TTAATTGGTC TCTTCTTTGC CATTTTAATC GCTGTAATTG TCTCTAGACT
121 TCGTTCAAAG CGTTTTAAGC TTCCCCCAGG ACCAATCCCA GTACCAGTTT TTGGTAATTG
181 GCTTCAAGTT GGTGATGATT TAAACCACAG AAATCTTACT GATTTTGCCA AAAAATTTGG
241 TGATCTTTTC TTGTTAAGAA TGGGCCAGCG TAATTTAGTT GTTGTGTCAT CTCCTGAATT
301 AGCTAAAGAA GTTTTACACA CACAAGGTGT TGAATTTGGT TCAAGAACAA GAAATGTTGT
361 ATTTGATATT TTTACTGGAA AAGGTCAAGA TATGGTTTTT ACTGTATATG GTGAACACTG
421 GAGAAAAATG AGGAGAATTA TGACTGTACC ATTTTTTACT AATAAAGTTG TGCAGCAATA
481 TAGAGGGGGG TGGGAGTTTG AAGTGGCAAG TGTAATTGAG GATGTGAAGA AAAATCCTGA
541 ATCTGCTACT AATGGGATTG TATNAAGGAG GAGATTACAA TTGATGATGT ATAATAATAT
601 GTTTAGGATT ATGTTTGATA GGAGATTTGA GAGTGAAGAT GATCCTTTGT TTGTTAAGCT
661 TAAGGCTTTG AATGGTGAAA GGAGTAGATT GGCTCAGAGT TTTGAGTATA ATTATGGTGA
721 TTTTATTCCC ATTTTGAGGC CTTTTTTGAG AGGTTATTTG AAGATCTGTA AAGAAGTTAA
781 GGAGAAGAGG CTGCAGCTTT TCAAAGATTA CTTTGTTGAT GAAAGAAAGA AGCTTTCAAA
841 TACCAAGAGC TTGGACAGCA ATGCTCTGAA ATGTGCGATT GATCACATTC TTGAGGCTCA
901 ACAGAAGGGG GAGATCAATG AGGACAACGT TCTTTACATT GTTGAAAACA TCAATGTTGC
961 TGCTATAGAA ACCACATTAT GGTCAATTGA GTGGGGTATC GCCGAGTTAG TCAACCACCC
1021 TCACATCCAA AAGAAACTCC GCGACGAGAT TGACACAGTT CTTGGCCCAG GAGTGCAAGT
1081 GACTGAACCA GACACCCACA AGCTTCCATA CCTTCAGGCT GTGATCAAGG AGACGCTTCG
1141 TCTCCGTATG GCAATTCCTC TATTAGTCCC ACACATGAAC CTTCACGATG CAAAGCTTGG
1201 CGGGTTTGAT ATTCCAGCAG AGAGCAAAAT CTTGGTTAAC GCTTGGTGGC TAGCTAACAA
1261 CCCGGCTCAT TGGAAGAAAC CCGAAGAGTT CAGACCCGAG AGGTTCTTCG AAGAGGAGAA
1321 GCACGTTGAG GCCAATGGCA ATGACTTCAG ATATCTTCCG TTTGGCGTTG GTAGGAGGAG
1381 TTGCCCTGGA ACTATACTTG CATTGCCAAT TCTTGGCATT ACTTTGGGAC GTTT

SEQ. ID. NO. 282

1 MDLLLLEKTL IGLFFAILIA VIVSRLRSKR FKLPPGPIPV PVFGNWLQVG DDLNHRNLTD
61 FAKKFGDLFL LRMGQRNLVV VSSPELAKEV LHTQGVEFGS RTRNVVFDIF TGKGQDMVFT
121 VYGEHWRKMR RIMTVPFFTN KVVQQYRGGW EFEVASVIED VKKNPESATN GIVLRRRLQL
181 MMYNNMFRIM FDRRFESEDD PLFVKLKALN GERSRLAQSF EYNYGDFIPI LRPFLRGYLK
241 ICKEVKEKRL QLFKDYFVDE RKKLSNTKSL DSNALKCAID HILEAQQKGE INEDNVLYIV
301 ENINVAAIET TLWSIEWGIA ELVNHPHIQK KLRDEIDTVL GPGVQVTEPD THKLPYLQAV
361 IKETLRLRMA IPLLVPHMNL HDAKLGGFDI PAESKILVNA WWLANNPAHW KKPEEFRPER
421 FFEEEKHVEA NGNDFRYLPF GVGRRSCPGT ILALPILGIT LGR

FIG. 142

NAME D136-AD5
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 283

```
   1 CCAAATTAGA GCAAGAAATT AACAAGTCTA GTTACCTTCT CCCTTTTTAA GAGTATTTAA
  61 GATTTAAGAT TTAAGATGAA GCAACTGAGG TAAGTCCTTT CAAGGAGTAG TTGTCACTTC
 121 TGAGAATGGA GATGATGTAC AGCATAATAG CAGCAGCCAG TATTGCAATT ATCTTGGTAT
 181 ATACATGGAA AGTGTTGAAT TGGGCTTGGT TTGGGCCAAA GAAAATGGAG AAATGCTTAA
 241 GACAGAGGGG TCTCAAGGGA AATCCTTATA AGCTACTCTA TGGAGATCTA AACGAACTGA
 301 CAAAAAGCAT AATAGAAGCC AAGTCTAAGC CCATCAATTT CTCTGATGAT ATTGCTCAAA
 361 GGCTCATCCC TTTTTTTCTT GACGCCATCA ACAAAAATGG TAAAAACTCC TTCGTCTGGC
 421 TTGGACCGTA TCCAATAGTG TTGATCACGG ATCCTGAGCA TTTAAAGGAG ATTTTCACAA
 481 AGAATTATGT GTATCAAAAG CAAACTCATC CCAATCCATA CGCCAAGCTA TTAGCTCACG
 541 GTCTTGTCAG CCTTGAGGAA GACAAATGGG CCAAACACAG AAAAATCATT AGTCCTGCCT
 601 TCCATGTCGA GAAGCTAAAG CATATGCTGC CTGCATTTTA TCTGAGTTGT AGTGAAATGA
 661 TAAGCAAATG GGAGGAGGTT GTTCCAAAAG AAACATCATT CGAGCTCGAT GTATGGCCAG
 721 ACCTTCAAAT AATGACCAGT GAAGTCATTT CTCGCACTGC ATTTGGGAGT AGCTATGAAG
 781 AAGGAAGAAT AGTATTTGAA CTTCAGAAAG AACAAGCTGA GTATGTAATG GACATAGGAC
 841 GTTCAATTTA TATACCAGGA TCAAGGTTCT TGCCTACTAA AAGGAACAAA AGAATGCTGG
 901 AAATTGAAAA GCAAGTGCAA ACAACAATTA GGCGTATCAT CGACAAAAGA TTGAAGGCAA
 961 TGGAAGAAGG GGAGACTAGT AAAGATGACT TATTAGGCAT ATTACTTGAA TCCAATTTGA
1021 AAGAAATTGA ACTTCATGGA AGAAATGACT TGGGAATAAC AACATCAGAA GTGATTGAAG
1081 AGTGCAAGTT AATCTATTTT GCCGGCCAAG AGACCACTTC AGTGTTGCTT GTTTGGACAA
1141 TGATTTTGTT GTGCTTACAT CCAGAGTGGC AAGTACGTGC CAGAAAGGAA GTGTTGCAGA
1201 CCTTTGGAAA TGATAAACCA GATTTGGAAG GACTAAGTCG CTTGAAAATT GTAACAATGA
1261 TCTTGTACGA GACGTTACGC CTATTCCCCC CATTACCAGC ATTTGGTAGA AGGAACAAAG
1321 AAGAAGTCAA ATTAGGGGAG CTACATCTAC CGGCTGGAGT GTTACTCGTT ATACCAGCAA
1381 TCTTAGTACA TTATGATAAG GAAATATGGG GTGAAGATGC AAAGGAATTC AAACCAGAAA
1441 GATTCAGTGA AGGAGTGTCA AAGGCAACAA ATGGACAAGT CTCATTTATA CCATTTAGCT
1501 AGGGACCTCG TGTTTGCATT GGACAAAACT TCGCAATGAT GGAAGCAAAA ATGGCAGTAA
1561 CTATGATACT ACAAAAATTC TCCTTTGAAC TATCCCCTTC TTATACACAT GCTCCATTTG
1621 CAATTGTGAC TATTCATCCC CAGTATGGTG CTCCTCTGCT TATGCGCAGA CTTTAAAACA
1681 TATGTTGCTG ATATTTAAGA TCAGTGGCGT TTTATTCTCC ATG
```

SEQ. ID. NO. 284

```
   1 MEMMYSIIAA ASIAIILVYT WKVLNWAWFG PKKMEKCLRQ RGLKGNPYKL LYGDLNELTK
  61 SIIEAKSKPI NFSDDIAQRL IPFFLDAINK NGKNSFVWLG PYPIVLITDP EHLKEIFTKN
 121 YVYQKQTHPN PYAKLLAHGL VSLEEDKWAK HRKIISPAFH VEKLKHMLPA FYLSCSEMIS
 181 KWEEVVPKET SFELDVWPDL QIMTSEVISR TAFGSSYEEG RIVFELQKEQ AEYVMDIGRS
 241 IYIPGSRFLP TKRNKRMLEI EKQVQTTIRR IIDKRLKAME EGETSKDDLL GILLESNLKE
 301 IELHGRNDLG ITTSEVIEEC KLIYFAGQET TSVLLVWTMI LLCLHPEWQV RARKEVLQTF
 361 GNDKPDLEGL SRLKIVTMIL YETLRLFPPL PAFGRRNKEE VKLGELHLPA GVLLVIPAIL
 421 VHYDKEIWGE DAKEFKPERF SEGVSKATNG QVSFIPFS
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FIG. 143

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NAME          D138-AD12
ORGANISM      NICOTIANA TABACUM
SEQ. ID. NO. 285
   1 TTTGCCTTTG CTCGTCATTG ATGACGACTT CATTTTGTTT TCTTCCCCAC GAAAATGGTA
  61 GATATGATAT GGAGGGACGT AGGGAAGAAT TACTGGGACA AACCTAGTGA GTGAAAATGG
 121 AAACAGTTGA AATGATAGTA AAAGTATCTT GTGCTGCCAT AGTAATTACT CTGTTGGTGT
 181 GTCTATGGAG AGTGCTGAAT TGGGTTTGGT TCAGACCAAA GAAATTAGAG AAGTTGTTGA
 241 GAAAACAGGT TTTGTATGGG GACATGAAAG AGTTTTCTGG GATGATTAAG GAAGCATACT
 301 CAAAGCCTAT GAGTCTGTCT GATGATGTAG CACCACGAAT GATGCCTTTC TTTCTTGAAA
 361 CCATCAAGAA ATATGGAAAA AGATCCTTTA TATGGTTCGG TCCAAGACCA CTAGTATTGA
 421 TCATGGATCC TGAGCTTATA AAGGAAGTAC TCTCCAAAAT CTATCTTTAT CAAAAGCCCG
 481 GTGGAAATCC ATTAGCAACA CTATTGGTAC AAGGATTAGC AACCTATGAG GAAGACAAAT
 541 GGGCCAAACA TAGAAAAATC ATCAATCCCG CTTTCCATCT AGAGAAGCTA AAGCATATGC
 601 TTCCAGCTTT TCGCTTGAGC TGTAGTGAGA TGCTGAGCAA ATGGGAAGAC ATTGTTTCAG
 661 CTGAAGGCTC ACATGAGATA GATGTATGGC CTAACCTTGA GCAATTGAGT TGCGATGTGA
 721 TCTCTCGGAC AGCTTTTGGC AATAGTTATG AAGAAGGTAG AAAGATTTTT GAACTTCAAA
 781 AGGAACAAAC TCAGCATCTT GTGGAAGCTT TCCGCTCTGT TTATATCCCA GGAAGGAGAT
 841 TTTTGCCAAC AAAGAGGAAT AGAAGAATGA AGGAAATAAA AAAGGAGGTT CGAGCGTCAA
 901 TTAAAGGTAT TATTGATAAA AGATTGAAGG CAATGAAAGC AGGGGACACC AATAATGAGG
 961 ATCTATTGGG ATATTGCTGG AATCAAATTT TAAAGAAATT GAACAGCGCG GAAACAAGGA
1021 TTTTGGAATG AGCATTGAAG ATGTCATTGA AGAATGCAAG TTATTCTATT TTGCTGGCCA
1081 AGAAACTACA TCAGTGTTGC TCCTATGGTC TCTAGTGTCG TTGAGCAGGT ATCAAGATTG
1141 GCAGACACGG GCCAGAGAAG AAGTCTTGCA TGTCTTTGGG AGTCGGAAAC CAGATTTTGA
1201 TGAATTAAAT CATCTAAAAG TTGTGACAAT GATCATGTAC GAGTCTTTAA GGCTATATCC
1261 CTCACTAATA ACACTTACCC GCCGGTGTAA TGAAGACATT GTATTAGGAG AACTATCTCT
1321 ACCAGCTGGT GTCCTAGTCT CTTTGCCAAT GATTTTGTTG CATCATGATG AAGAGATATG
1381 GGGTGAAGAT GCAAAGGAGT TCAAACCAGA GAGATTTAGA GAAGGATTGT CAAGTGCAAC
1441 AAAGGGTCAA CTTACATATT TTCCATTTGG CTGGGGTCCT AGAATATGTA TTGGACAAAA
1501 TTTTGCCATG TTAGAAGCAA AGATGGCTCT GTCTATGATC CTGCAACGCT TCTCTTTTGA
1561 ACTGTCTCCG TCTTATGCAC ATGCCCCTCA GTCCATATTA ACCGTTCAGC CTCAATATGG
1621 TGCTCCACTT ATTTTCCACA AGCTATAATT TGGTACTTGT GAAAGGTGTC TTGTACAATA
1681 TGTTAGTAGA GTTTATTCAG ACTTAGATAC ATGCTTC

SEQ. ID. NO. 286
   1 METVEMIVKV SCAAIVITLL VCLWRVLNWV WFRPKKLEKL LRKQVLYGDM KEFSGMIKEA
  61 YSKPMSLSDD VAPRMMPFFL ETIKKYGKRS FIWFGPRPLV LIMDPELIKE VLSKIYLYQK
 121 PGGNPLATLL VQGLATYEED KWAKHRKIIN PAFHLEKLKH MLPAFRLSCS EMLSKWEDIV
 181 SAEGSHEIDV WPNLEQLSCD VISRTAFGNS YEEGRKIFEL QKEQTQHLVE AFRSVYIPGR
 241 RFLPTKRNRR MKEIKKEVRA SIKGIIDKRL KAMKAGDTNN EDLLGYCWNQ ILKKLNSAET
 301 RILE
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NAME          D216-AG8
ORGANISM      NICOTIANA TABACUM
SEQ. ID. NO. 287
        1 CCAAAATGCA GTTCTTCAAC TTCATTTCCT TTGTCTTTTT TGTGTCTTTC CTCTTTTTAT
       61 TAAGGAAATG GAAGAACTCC AATAGCCAAA CCAAAAGATT GCCTCCAGGT CCATGGAAAT
      121 TACCTGTACT TGGAAGCATG TTTCATTTGC TAGGTGGACC TCCACATCAT GTCCTTGGAG
      181 ATTTAGCCAA AAAATATGGT CCACTTATGC ACCTTCAACT AGGTGAAGTT TCTGTAGTTT
      241 CTGTTACTTC TCCTGAGATG GCAAAAGAAG TACTAAAAAC TCATGACCTC GCTTTTGCAT
      301 CTAGGCCGTT ACTTTTGGCA GCCAAAATTG TCTGCTATAA TGGGACAGAC ATTGTCTTTT
      361 CCCCCTATGG CGATTATTGG AGACAAACGC GTAAAATTTG TCTCTTGGAA TTGCTCAGTG
      421 CCAAAAATGT TAGGTCATTC AGCTCAGTCA GACGAGATGA AGTTTTCCAT ATGATTGAAT
      481 TTTTTTCGAT CATCTTCTGG TAAGCCAGTT AATGTATCAA AAAGGATTTC TCTATTCACA
      541 ACCTCTATGA CATGTAGATC AGCCTTTGGA CAAGAATACA AGGAGCAAGA CGAATTCGCA
      601 CAACTAGTAA AAAAAGTGTC AAGCTTAATG GAAGGGTTTG ATGTTGCTGA TATATTCCCT
      661 TCATTGAAGT TTCTTCATGT GCTCAGTGGA ATGAAGGCTA AAGTTATGGA TGCACACCAT
      721 GAGTTAGATG CCATTCTTGA AAAAATTATC AATGAGCACA AGAAAATTGC AACTGGAAAG
      781 AATAATAATG AATTAGGAGG TGAAGGATTA ATTGACGTAC TGCTAAGACT TATGAAAGAG
      841 GGAGGCCTTC AATTCCCGAT CACCAACGAC AACATCAAAG CTATTATTTT TGACATGTTT
      901 GGTGCGGGAA CGGAAACTTC ATCAACCACA ATTGACTGGG CCATGGTCGA AATGATAAAG
      961 AATCCAAGTG TATTCGCTAA AGCTCAAGCA GAGGTAAGAG AAGCCTTCAG AGAGAAAGAA
     1021 ACTTTTGATG AAAATGATGT CGAGGAGTTG AAATACTTAA AATTGGTTAT CAAAGAAACT
     1081 TTCAGACTCC ATCCTCCATT TCCCCTTTTG CTCCCAAGAG AATCTAGAGA AGAAACAGAT
     1141 ATAAACGGCT ACACTATTCC TTTTAAAACA AAACTTATGG TTAACGTTCG GGCTATTGGA
     1201 AGAGATCCAA AATATTGGGA TGACGTGGAA AGTTTTAAGC CAGAGAGATT TGAGCACAAC
     1261 TCTATGGATT TTATTGGTAA TAATTTTGAA TATCTTCCCT TTGGTAGTGG AAGGAGAATG
     1321 TGCCCTGGGA TATCATTTGG TTTGGCTAAT GTTTATTTGC CACTAGCTCA ATTGTTATAT
     1381 CATTTTGATT GGAAACTCCC TACTGGAATC AATTCAAGTG ACTTGGACAT GACTGAGTCG
     1441 TCAGGAGTAA CTTGTGCTAG AAAGAGTGAT TTATACTTGA CTGCTACTCC ATATCAACTT
     1501 TCTCAAGAGT GATGCAATGA TATCAACCTT TTGAATTTCG GTCAACCCCA CCAATAGTG

SEQ. ID. NO. 288
        1 MQFFNFISFV FFVSFLFLLR KWKNSNSQTK RLPPGPWKLP VLGSMFHLLG GPPHHVLGDL
       61 AKKYGPLMHL QLGEVSVVSV TSPEMAKEVL KTHDLAFASR PLLLAAKIVC YNGTDIVFSP
      121 YGDYWRQTRK ICLLELLSAK NVRSFSSVRR DEVFHMIEFF SIIFW
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FIG. 145

NAME D243-AB3
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 289

```
   1 CCCCACCAAA AAATCATTTC TCTCGTCTAA AATGGATCTT CTCTTACTAG AGAAGACCTT
  61 AATTGGTCTT TTCTTTGCCA TTTTAATCGC TTTAATTGTC TCTAAACTTC GTTCAAAGCG
 121 TTTTAAGCTT CCTCCAGGAC CAATTCCAGT ACCAGTTTTT GGTAATTGGC TTCAAGTTGG
 181 TGATGATTTA AACCACAGAA ATCTTACTGA TTATGCCAAG AAATTTGGAG ATCTTTTCTT
 241 GTTAAGAATG GGTCAACGTA ACTTAGTTGT TGTGTCATCT CCTGAATTAG CTAAAGAAGT
 301 TTTACACACA CAAGGTGTTG AATTTGGTTC AAGAACAAGA AATGTTGTGT TTGATATTTT
 361 TACTGGAAAA GGTCAAGATA TGGTTTTTAC TGTATATGGT GAACATTGGA GAAAAATGAG
 421 GAGAATTATG ACTGTACCAT TTTTTACTAA TAAAGTTGTG CAACAGTATA GAGGGGGGTG
 481 GGAGTTTGAG GTGGCAAGTG TAATTGAGGA TGTGAAAAAA AATCCTGAAT CTGCTACTAA
 541 TGGGATCGTA TTAAGGAGGA GATTACAATT AATGATGTAT AATAATATGT TTAGGATTAT
 601 GTTTGATAGG AGATTTGAGA GTGAAGATGA TCCTTTGTTT GTTAAGCTTA AGGCTTTGAA
 661 TGGTGAAAGG AGTAGATTGG CTCAAAGTTT TGAGTATAAT TATGGTGATT TTATTCCAAT
 721 TTTGAGGCCT TTTTTTGAGA GGTTATTTGA AGATCTGTAA AGAAGTTAAG GAGAAGAGGC
 781 TGCAGCTTTT CAAAGATTAC TTTGTTGATG AAAGAAAGAA GCTTTCGAAT ACCAAGAGCT
 841 CGGACAGCAA TGCCCTAAAA TGTGCGATTG ATCACATTCT TGAGGCTCAA CAGAAGGGAG
 901 AGATCAATGA GGACAACGTT CTTTACATTG TTGAAAACAT CAATGTTGCT GCAATTGAAA
 961 CAACATTATG GTCAATTGAG TGGGGTATCG CCGAGCTAGT CAACCACCCT CACATCCAAA
1021 AGAAACTGCG CGACGAGATT GACACAGTTC TTGGACCAGG AGTGCAAGTG ACTGAACCAG
1081 ACACCCACAA GCTTCCATAC CTTCAGGCTG TGATCAAGGA GGCACTTCGT CTCCGTATGG
1141 CAATTCCTCT ATTAGTCCCA CACATGAACC TTCACGACGC AAAGCTTGGC GGGTTTGATA
1201 TTCCAGCAGA GAGCAAAATC TTGGTTAACG CTTGGTGGTT AGCTAACAAC CCGGCTCATT
1261 GGAAGAAACC CGAAGAGTTC AGACCCGAGA GGTTCTTTGA AGAGGAGAAG CATGTTGAGG
1321 CCAATGGCAA TGACTTCAGA TATCTTCCGT TTGGCGTTGG TAGGAGGAGC TGCCCTGGAA
1381 TTATACTTGC ATTGCCAACT CTTGGCATCA CTTTGGGACG TTTGGTTCAG AACTTTGAGC
1441 TGTTGCCTCC TCCAGGCCAG TCGAAGCTCG ACACCACAGA GAAAGGTGGA CAGTTCAGTC
1501 TCCACATTTT GAAGCATTCC ACCATTGTGT TGAAACCAAG GTCTTTCTGA ACTTTGTGAT
1561 CTTATTAATT AAGGGGTTCT GAAGAAATTT GATAGTGTTG G
```

SEQ. ID. NO. 290

```
   1 MDLLLLEKTL IGLFFAILIA LIVSKLRSKR FKLPPGPIPV PVFGNWLQVG DDLNHRNLTD
  61 YAKKFGDLFL LRMGQRNLVV VSSPELAKEV LHTQGVEFGS RTRNVVFDIF TGKGQDMVFT
 121 VYGEHWRKMR RIMTVPFFTN KVVQQYRGGW EFEVASVIED VKKNPESATN GIVLRRRLQL
 181 MMYNNMFRIM FDRRFESEDD PLFVKLKALN GERSRLAQSF EYNYGDFIPI LRPFFERLFE
 241 DL
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FIG. 146

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NAME        D250-AC11
ORGANISM    NICOTIANA TABACUM
SEQ. ID. NO. 291
     1 ATAATGCTCT TTCTACTCTT TGTAGCCCTT CCTTTCATTC TTATTTTTCT TCTTCCTAAA
    61 TTCAAAAATG GTGGAAATAA CAGATTGCCA CCAGGTCCTA TAGGTTTACC ATTCATTGGA
   121 AATTTGCATC AATATGATAG TATAACTCCT CATATCTATT TTTGGAAACT TTCCAAAAAA
   181 TATGGCAAAA TCTTCTCATT AAAACTTGCT TCTACTAATG TGGTAGTAGT TTCTTCAGCA
   241 AAATTAGCAA AAGAAGTATT GAAAAAACAA GATTTAATAT TTTGTAGTAG ACCATCTATT
   301 CTTGGCCAAC AAAAACTGTC TTATTATGGT CGTGATATTG CTTTTGCACC TTATAATGAT
   361 TATTGGAGAG AAATGAGAAA AATTTGTGTT CTTCATCTTT TTAGTTTAAA AAAAGTTCAA
   421 TTATTTAGTC CAATTCGTGA AGATGAAGTT TTTAGAATGA TTAAGAAAAT ATCAAAACAA
   481 GCTTCTACTT CACAAATTAT TAATTTGAGT AATTTAATGA TTTCATTAAC AAGTACAATT
   541 ATTTGTAGAG TTGCTTTTGG TGTTAGGTTT GAAGAAGAAG CACATGCAAG GAAGAGATTT
   601 GATTTTCTTT TGGCCGAGGC ACAAGAAATG ATGGCTAGTT TCTTTGTATC TGATTTTTTT
   661 CCCTTTTTAA GTTAGATTGA CAAATTAAGT GGATTGACAT ATAGACTTGA GAGGAATTTC
   721 AAGGATTTGG ATAATTTTTA TGAAGAACTC ATTGAGCAAC ATCAAAATCC TAATAAGCCA
   781 AAATATATGG AAGGAGATAT TGTTGATCTT TTGCTACAAT TGAAGAAAGA GAAATTAACA
   841 CCACTTGATC TCACTATGGA AGATATAAAA GGAATTCTCA TGAATGTGTT AGTTGCAGGA
   901 TCAGACACTA GTGCAGCTGC TACTGTTTGG GCAATGACAG CCTTGATAAA GAATCCTAAA
   961 GCCATGGAAA AAGTTCAATT AGAAATCAGA AAATCAGTTG GGAAGAAAGG CATTGTAAAT
  1021 GAAGAAGATG TCCAAAACAT CCCTTATTTT AAAGCAGTGA TAAAGGAAAT ATTTAGATTG
  1081 TATCCACCAG CTCCACTTTT AGTTCCAAGA GAATCAATGG AAAAAACCAT ATTAGAAGGT
  1141 TATGAAATTC GGCCAAGAAC CATAGTTCAT GTTAACGCTT GGGCTATAGC AAGGGATCCT
  1201 GAAATATGGG AAAATCCAGA TGAATTTATA CCTGAGAGAT TTTTGAATAG CAGTATCGAT
  1261 TACAAGGGTC AAGATTTTGA GTTACTTCCA TTTGGTGCAG GCAGAAGAGG TTGCCCAGGT
  1321 ATTGCACTTG GGGTTGCATC CATGGAACTT GCTTTGTCAA ATCTTCTTTA TGCATTTGAT
  1381 TGGGAGTTGC CTTATGGAGT GAAAAAAGAA GACATCGACA CAAACGTTAG GCCTGGAATT
  1441 GCCATGCACA AGAAAAACGA ACTTTGCCTT GTCCCAAAAA AATTATTTAT AAATTATATT
  1501 GGGACGTGGA TCTCATGCTA GTTCTGTGCG GTCAGCTAAG CTTA

SEQ. ID. NO. 292
     1 MLFLLFVALP FILIFLLPKF KNGGNNRLPP GPIGLPFIGN LHQYDSITPH IYFWKLSKKY
    61 GKIFSLKLAS TNVVVVSSAK LAKEVLKKQD LIFCSRPSIL GQQKLSYYGR DIAFAPYNDY
   121 WREMRKICVL HLFSLKKVQL FSPIREDEVF RMIKKISKQA STSQIINLSN LMISLTSTII
   181 CRVAFGVRFE EEAHARKRFD FLLAEAQEMM ASFFVSDFFP FLS.IDKLSG LTYRLERNFK
   241 DLDNFYEELI EQHQNPNKPK YMEGDIVDLL LQLKKEKLTP LDLTMEDIKG ILMNVLVAGS
   301 DTSAAATVWA MTALIKNPKA MEKVQLEIRK SVGKKGIVNE EDVQNIPYFK AVIKEIFRLY
   361 PPAPLLVPRE SMEKTILEGY EIRPRTIVHV NAWAIARDPE IWENPDEFIP ERFLNSSIDY
   421 KGQDFELLPF GAGRRGCPGI ALGVASMELA LSNLLYAFDW ELPYGVKKED IDTNVRPGIA
   481 MHKKNELCLV PKKLFINYIG TWISC
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FIG. 147

NAME D205-AH4
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 293

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   1 GTGAGGTTTG AATCCTCTGC CTCAATGAAA CTCACCAAAT TGGTTTTCTA ATTTCCATCT
  61 AAAATATTGT CCAAAGCTAA AGATTCTTTC TCCTTAAATA GTCAACTTTA GTGGTTCCTC
 121 TTCATTTCAT AGCTCAATCT TTCTTATTTT GATTCAACCA TGGAGAACCA ATACTCCTAC
 181 TCATTCTCTT CCTACTTCTA CTTAGCTATA GTACTGTTTC TTCTTCCAAT TTTGGTCAAA
 241 TATTTCTTCC ATCGGAGAAG AAATTTACCT CCAAGTCCAT TTTCTCTTCC AATAATTGGT
 301 CACCTTTACC TTCTCAAGAA AACTCTCCAT CTCACTCTAA CATCCTTATC AGCTAAATAT
 361 GGTCCTGTTT TATACCTCAA ATTGGGCTCT ATGCCTGTGA TTGTTGTGTC CTCACCATCT
 421 GCTGTTGAAG AATGTTTAAC CAAGAATGAT ATCATATTCG CAAATAGGCC CAAGACCGTG
 481 GCTGGTGACA AGTTTACCTA CAATTATACT GTTTATGTTT GGGCACCCTA TGGCCAACTT
 541 TGGAGAATTC TTCGCCGATT AACTGTCGTT GAACTCTTCT CTTCACATAG CCTACAGAAA
 601 ACTTCTATCC TTAGAGATCA AGAAGTTGCA ATATTTATCC GTTCGTTATA CAAATTCTCA
 661 AAGGATAGTA GCAAAAAAGT CGATTTGACC AACTGGTCTT TTACTTTGGT TTTCAATCTT
 721 ATGACCAAAA TTATTGCTGG GAGACATATT GTGAAGGAGG AAGATGCTGG CAAGGAAAAG
 781 GGCATTGAAA TTATTGAAAA ACTTAGAGGG ACTTTCTTAG TAACTACATC ATTCTTGAAT
 841 ATGTGTGATT TCTTGCCAGT ATTCAGGTGG GTTGGTTACA AAGGGCTGGA GAAGAAGATG
 901 GCCTCAATTC ACAATAGAAG AAATGAATTC TTGAACAGCT TGCTTGATGA ATTTCGACAC
 961 AAGAAAAGTA GTGCTTCACA ATCTAACACA ACTGTTGGAA ACATGGAGAA GAAAACCACA
1021 CTGATTGAAA AGCTCTTGTC TCTTCAAGAA TCAGAGCCTG AATTCTACAC TGATGATATC
1081 ATCAAAAGTA TTATGCTGGT AGTTTTTGTT GCAGGAACAG AGACCTCATC AACAACCATC
1141 CAATGGGTAA TGAGGCTTCT TGTAGCTCAC CCTGAGGCAT TGTATAAGCT ACGAGCTGAC
1201 ATTGACAGTA AAGTTGGGAA TAAGCGCTTG CTGAATGAAT CAGACCTCAA CAAGCTTCCG
1261 TATTTGCATT GTGTTGTTAA TGAGACAATG AGATTATACA CTCCGATACC ACTTTTATTG
1321 CCTCATTATT CAACTAAAGA TTGTATTGTG GAAGGATATG ATGTACCAAA ACATACAATG
1381 TTGTTTGTCA ACGCTTGGGC CATTCACAGG GATCCCAAGG TATGGGAGGA GCCTGACAAG
1441 TTCAAGCCAG AGAGATTTGA GGCAACAGAA GGGGAAACAG AAAGGTTCAA TTACAAGCTT
1501 GTACCATTTG GAATGGGGAG AAGAGCGTGC CCTGGAGCTG ATATGGGGTT GCGAGCAGTT
1561 TCTTTGGCAT TAGGTGCACT TATTCAATGC TTTGACTGGC AAATTGAGGA AGCGGAAAGC
1621 TTGGAGGAAA GCTATAATTC TAGAATGACT ATGCAGAACA AGCCTTTGAA GGTTGTCTGC
1681 ACTCCACGCG AAGATCTTGG CCAGCTTCTA TCCCAACTCT AAGGCAATTT ATCAATGCCA
1741 AACGTAATCT TCATCTACCA CTATG
```

SEQ. ID. NO. 294

```
   1 MENQYSYSFS SYFYLAIVLF LLPILVKYFF HRRRNLPPSP FSLPIIGHLY LLKKTLHLTL
  61 TSLSAKYGPV LYLKLGSMPV IVVSSPSAVE ECLTKNDIIF ANRPKTVAGD KFTYNYTVYV
 121 WAPYGQLWRI LRRLTVVELF SSHSLQKTSI LRDQEVAIFI RSLYKFSKDS SKKVDLTNWS
 181 FTLVFNLMTK IIAGRHIVKE EDAGKEKGIE IIEKLRGTFL VTTSFLNMCD FLPVFRWVGY
 241 KGLEKKMASI HNRRNEFLNS LLDEFRHKKS SASQSNTTVG NMEKKTTLIE KLLSLQESEP
 301 EFYTDDIIKS IMLVVFVAGT ETSSTTIQWV MRLLVAHPEA LYKLRADIDS KVGNKRLLNE
 361 SDLNKLPYLH CVVNETMRLY TPIPLLLPHY STKDCIVEGY DVPKHTMLFV NAWAIHRDPK
 421 VWEEPDKFKP ERFEATEGET ERFNYKLVPF GMGRRACPGA DMGLRAVSLA LGALIQCFDW
 481 QIEEAESLEE SYNSRMTMQN KPLKVVCTPR EDLGQLLSQL
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FIG. 148

NAME D267-AF10
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 295

```
   1 AACATCCTTT CCTTCTTCCA AAAATGGAGC TTCAATCTTC TCCTTTCAAT TTAATTTCTT
  61 TGTTCCTCTT CTTTTCTTTT CTTTTTATTC TAGTGAAGAA ATGGAATGCC AAAATCCCAA
 121 AGTTACCTCC AGGTCCGTGG AGGCTTCCCT TTATTGGAAG CCTCCATCAC TTGAAGGGAA
 181 AACTTCCACA CCATAATCTT AGAGATCTAG CGCGAAAATA TGGACCTCTC ATGTACTTAC
 241 AACTCGGAGA AATTCCTGTA GTTGTAATAT CTTCGCCACG TGTAGCAAAA GCTGTACTAA
 301 AAACTCATGA TCTCGCTTTT GCAACTAGAC CACGATTCAT GTCCTCAGAC ATTGTGTTTT
 361 ACAAAAGCAG GGACATCTCT TTTGCCCCAT TTGGTGATTA CTGGAGACAG ATGCGTAAAA
 421 TATTGACTCA GGAACTCCTG AGCAACAAGA TGCTCAAGTC ATATAGCTTA ATCCGAAAGG
 481 ATGAGCTCTC GAAGCTCCTC TCATCGATTC GTTTGGAAAC AGGTTCTGCA GTGAACATAA
 541 ATGAAAAGCT TCTCTGGTTT ACGAGCTGCA TGACCTGTAG ATTAGCCTTT GGAAAAATAT
 601 GCAATGATCG GGATGAGTTG ATCATGCTAA TTAGGGAGAT ATTAACATTA TCAGGAGGAT
 661 TTGATGTGGG TGATTTGTTC CCTTCCTGGA AATTACTTCA TAATATGAGC AACATGAAAG
 721 CTAGGTTGAC GAATGTACAC CACAAGTATG ATTTAGTTAT GGAGAACATC ATCAATGAGC
 781 ACCAAGAGAA TCATGCAGCA GGGATAAAGG GTAACAACGA GTTTGGTGGC GAAGATATGA
 841 TCGATGCTCT ACTGAGGGCT AAGGAGAATA ATGAGCTTCA ATTTCCTATC GAAAATGACA
 901 ACATGAAAGC AGTAATTCTG GACTTGTTTA TTGCTGGAAC TGAAACTTCA TATACTGCAA
 961 TTATATGGGC ACTATCAGAA TTGATGAAGC ACCCAAGTGT GATGGCCAAG GCACAAGCTG
1021 AAGTGAGAAA AGTCTTCAAA GAAAATGAAA ATTTCGACGA AAATGATCTT GACAAGTTGC
1081 CATACCTAAA ATCAGTGATT AAAGAAACAC TAAGGATGCA CCCTCCAGTT CCTTTGTTAG
1141 GGCCTAGAGA ATGCAGGGAC CAAACAGAGA TCGATGGCTA CACTGTACCT ATTAAAGCTA
1201 GAGTTATGGT TAATGCTTGG GCGATAGGAA GAGATCCTGA AAGTTGGGAA GATCCTGAAA
1261 GTTTCAAACC GGAGCGATTT GAAAATACTT CTGTTGATCT TACAGGAAAT CACTATCAGT
1321 TCATTCCTTT CGGTTCAGGA AGAAGAATGT GTCCAGGAAT GTCGTTTGGT TTAGTTAACA
1381 CAGGGCATCC TTTAGCCCAG TTGCTCTATT GCTTTGACTG GAAACTCCCT GACAAGGTTA
1441 ATGCAAATGA TTTTCGCACT ACTGAAACAA GTAGAGTTTT TGCAGCAAGC AAAGATGACC
1501 TCTACTTGAT TCCCACAAAT CACAGGGAGC AAGAATAGCT TAATTTAATG GAGTTCTTGG
1561 AAGAATTAAA GAAGAAGGGC TATATAGGTG AGATTTTTTG TATGGTTGCA AGGTTTTTAG
1621 TTCATACAAT AAGACAATAC ATTATATTCC AGTATTGTGT ATCATGTATA ATAAGGTTCC
1681 TTTTGTTTAA AAAA
```

SEQ. ID. NO. 296

```
   1 MELQSSPFNL ISLFLFFSFL FILVKKWNAK IPKLPPGPWR LPFIGSLHHL KGKLPHHNLR
  61 DLARKYGPLM YLQLGEIPVV VISSPRVAKA VLKTHDLAFA TRPRFMSSDI VFYKSRDISF
 121 APFGDYWRQM RKILTQELLS NKMLKSYSLI RKDELSKLLS SIRLETGSAV NINEKLLWFT
 181 SCMTCRLAFG KICNDRDELI MLIREILTLS GGFDVGDLFP SWKLLHNMSN MKARLTNVHH
 241 KYDLVMENII NEHQENHAAG IKGNNEFGGE DMIDALLRAK ENNELQFPIE NDNMKAVILD
 301 LFIAGTETSY TAIIWALSEL MKHPSVMAKA QAEVRKVFKE NENFDENDLD KLPYLKSVIK
 361 ETLRMHPPVP LLGPRECRDQ TEIDGYTVPI KARVMVNAWA IGRDPESWED PESFKPERFE
 421 NTSVDLTGNH YQFIPFGSGR RMCPGMSFGL VNTGHPLAQL LYCFDWKLPD KVNANDFRTT
 481 ETSRVFAASK DDLYLIPTNH REQE
```

FIG. 149

NAME D284-AH5
ORGANISM NICOTIANA TABACUM
SEQ. ID. NO. 297

```
   1 CAATCAGTGG ATGCGGGAGT AATATATAAT ATGCAAGTTG TAGAAAGAGA AAAAAAAAAT
  61 CAAGTAGCTA TTCTATACTG GGGCACAAAT AGTGAGTGAA AATGGAGACT GTTCAAATCA
 121 TAATAACAGC ATCTTGTGCT GCCATAATAA TTACTCTAGT GGTGTGTATT TGGAGAGTAC
 181 TGAATTGGGT TTGGTTCAGA CCAAAGAAGC TGGAAAAACT ATTGAGGAAA CAAGGTCTCA
 241 AAGGCAACTC CTACAAGATT TTGTATGGGG ATATGAAGGA GCTTTCTGGT ATGATTAAGG
 301 AAGCTAATTC CAAACCCATG AATCTTTCTG ATGATATTGC ACCAAGATTG GTGCCTTTCT
 361 TTCTTGACAC CATCAAGAAA TATGGTAAAA AATCCTTTGT ATGGTTAGGT CCGAAACCAC
 421 TGGTTCTTAT CATGGACCCT GAGCTTATAA AGGAAATATT TTCCAAATAC TATCTGTATC
 481 AAAAGCCTCA TGGAAATCCA GTTACCAAGC TATTAGTACA AGGACTAGTA AGCCTAGAGG
 541 AAGACAAATG GGCCAAACAT AGAAAAATCA TCAATCCAGC TTTCCATCTA GAGAAGCTAA
 601 AGCATATGCT TCCAGCTTTT TGCTTGAGCT GCACTGAGAT GCTGTGCAAA TGGGAAGATA
 661 TTGTTTCAAT TAAGGGCTCA CATGAGATAG ATGTATGGCC TCACCTTGAA CAATTAAGTA
 721 GCGATGTGAT CTCTCGGACA GCTTTTGGCA GTAACTTTGA AGAAGGTAAA AGGATATTTG
 781 AACTTCAGAA GGAACAAGCT CAGTATTTTG TAGAAGCTAT ACGCTCGGTT TATATACCAG
 841 GCTGGAGGTT TTTGCCAACA AAGAGGAACA GAAGAATGAA GGAAGTTGAA AAGGATGTTC
 901 GGGCCTCGAT AAGAGGCATT ATTGATAAAA GAGTGAAGGC AATGAAAGCA GGAGAGGCGA
 961 GTAATGAGGA TCTACTTGGT ATATTGTTGG AATCTAATTT TACAGAAGCT GAACAGCATA
1021 GACACAAGGA TTCTGCGATG AGCATTGAAG AAGTCATTCA AGAATGCAAG TTATTCTATG
1081 TTGCTGGCCA AGAAACTACA TCAGTGTTGC TTGTGTGGAC TCTAATATTG TTGAGTAGGC
1141 ATCAAGATTG GCAGAGCCGA GCCAGAGAAG AGGTGTTTCA AGTCTTTGGT AATCAGAAAC
1201 CAGATTTTGA CGGATTGAAT CGTCTAAAAG TTGTGACAAT GATCTTGTAT GAGTCTTTAA
1261 GGCTATACTC CCCAGTAGTG TCACTAATCC GGCGGCCTAA TGAGGATGCT ATATTAGGAA
1321 ATGTATCTCT GCCAGAAGGT GTGCTACTCT CATTACCAGT GATCTTATTA CACCACGATG
1381 AAGAGATATG GGGTAAAGAT GCAAAGAAGT TCAATCCAGA AAGATTTAGA GATGGAGTCT
1441 CAAGTGCAAC AAAGGGTCAA GTCACTTTTT TTCCATTTAC TTGGGGTCCC AGAATATGCA
1501 TCGGACAAAA TTTTGCCATG TTAGAAGCAA AGACTGCTTT GGCTATGATC CTACAACGCT
1561 TCTCATTCGA ACTGTCTCCA TCTTATGCAC ATGCTCCTCA GTCCATATTA ACTATGCAAC
1621 CCCAACATGG TGCTCCACTA ATTCTGCACA AAATATAGTT TGTTACTTTA AGCAGTGTCT
1681 TGTTATATGT CAGAGAGTCC AAAATGTTTA ATTAAGGCTT GTAGAACTGC CAAATGGAAC
1741 TTCATTTGCA TTCGTGGGTT GTAGATTGTT GTAATTGGAC AAGTATACTG TTTATTTTAG
1801 AGTTTTAAGA AAAAAAAAA
```

SEQ. ID. NO. 298

```
   1 METVQIIITA SCAAIIITLV VCIWRVLNWV WFRPKKLEKL LRKQGLKGNS YKILYGDMKE
  61 LSGMIKEANS KPMNLSDDIA PRLVPFFLDT IKKYGKKSFV WLGPKPLVLI MDPELIKEIF
 121 SKYYLYQKPH GNPVTKLLVQ GLVSLEEDKW AKHRKIINPA FHLEKLKHML PAFCLSCTEM
 181 LCKWEDIVSI KGSHEIDVWP HLEQLSSDVI SRTAFGSNFE EGKRIFELQK EQAQYFVEAI
 241 RSVYIPGWRF LPTKRNRRMK EVEKDVRASI RGIIDKRVKA MKAGEASNED LLGILLESNF
 301 TEAEQHRHKD SAMSIEEVIQ ECKLFYVAGQ ETTSVLLVWT LILLSRHQDW QSRAREEVFQ
 361 VFGNQKPDFD GLNRLKVVTM ILYESLRLYS PVVSLIRRPN EDAILGNVSL PEGVLLSLPV
 421 ILLHHDEEIW GKDAKKFNPE RFRDGVSSAT KGQVTFFPFT WGPRICIGQN FAMLEAKTAL
 481 AMILQRFSFE LSPSYAHAPQ SILTMQPQHG APLILHKI
```

FIGURE [redacted] COMPARISON OF SEQUENCE GROUPS

ALIGNMENT OF GROUP 1

```
D58-BG7     GCACAACTTGCTATCAACTTGGTCACATCTATGTTGGGTCATTTGTTGCATCATTTTACA   SEQ ID No 1
                                                           |
D58-AB1     GCACAACTTGCTATCAACTTGGTCACATCTATGTTGGGTCATTTGTTGCATCATTTTACG   SEQ ID No 3
                                                           |
D58-BE4     GCACAACTTGCTATCAACTTGGTCACATCTATGTTGGGTCATTTGTT-CATCATTTTACA   SEQ ID No 7
            *********************************************** ************

D58-BG7     TGGGCTCCGGCCCCGGGGGTTAACCCGGAGGATATTGACTTGGAGGAGCCCTGGAACA
                     |                    |
D58-AB1     TGGGCTCCGCCCCCGGGGGTTAACCCGGAGAATATTGACTTGGAGGAGCCCTGGAACA
                     |                    |
D58-BE4     TGGGCTCCGGCCCCGGGGGTTAACCCGGAGGATATTGACTTGGAGGAGCCCTGGAACA
            ********* ******************** ***************************

D58-BG7     GTAACTTACATGAAAAATCCAATACAAGCTATTCCAACTCCAAGATTGCCTGCACACTTG
                                               |
D58-AB1     GTAACTTACATGAAAAATCCAATACAAGCTATTCCTACTCCAAGATTGCCTGCACACTTG]
                         |||||||||||||||||||||||||||||||||||||||||||||||
D58-BE4     GTAACTTACATGA-----------------------------------------------
            *************

D58-BG7     TATGGACGTGTGCCAGTGGATATGTAA

D58-AB1     TATGGACGTGTGCCAGTGGATATGTAA
            |||||||||||||||||||||||||||
D58-BE4     ---------------------------
```

PERCENT IDENTITY OF GROUP 1

	D58-BG7	D58-BE4	D58-AB1	
D58-BG7	***	96.2	98.1	SEQ ID No 1
D58-BE4		***	94.0	SEQ ID No 7
D58-AB1			***	SEQ ID No 3

ALIGNMENT OF GROUP 2

```
D56-AH7     GAAGGATTGGCTGTTCGAATGGTTGCCTTGTCATTGGGATGTATTATTCAATGTTTTGAT   SEQ ID No 9
                        |             |                          |
D13a-5      GAAGGATTGGCTATTCGAATGGTTGCATTGTCATTGGGATGTATTATTCAATGCTTTGAT   SEQ ID No 11
            ************ ************* ************************** ******

D56-AH7     TGGCAACGAATCGGCGAAGAATTGGTTGATATGACTGAAGGAACTGGACTTACTTTGCCT
                     | |  |    |           |
D13a-5      TGGCAACGACTTGGGGAAGGATTGGTTGATAAGACTGAAGGAACTGGACTTACTTTGCCT
            ********* * ** **** *********** ****************************

D56-AH7     AAAGCTCAACCTTTGGTGGCCAAGTGTAGCCCACGACCTAAAATGGCTAATCTTCTCTCT
                          |                         |               |
D13a-5      AAAGCTCAACCTTTAGTGGCCAAGTGTAGCCCACGACCTATAATGGCTAATCTTCTTTCT
            ************** ************************* *************** ***

D56-AH7     CAGATTTGA

D13a-5      CAGATTTGA
            *********
```

PERCENT IDENTITY OF GROUP 2

	D56-AH7	D13a-5	
D56-AH7	***	93.7	SEQ ID No 9
D13a-5		***	SEQ ID No 11

FIGUR[redacted]15I COMPARISON OF SEQUENCE GROUPS

ALIGNMENT OF GROUP 3

```
D56-AG10    ATAGGTTTTGCGACTTTAGTGACACATCTGACTTTTGGTCGCTTGCTTCAAGGTTTTGAT   SEQ ID No 13
                 |
D35-33      ATAGGCTTTGCGACTTTAGTGACACATCTGACTTTTGGTCGCTTGCTTCAAGGTTTTGAT   SEQ ID No 15
               |||
D34-62      ATAAATTTTGCGACTTTAGTGACACATCTGACTTTTGGTCGCTTGCTTCAAGGTTTTGAT   SEQ ID No 17
            ***   ******************************************************

D56-AG10    TTTAGTAAGCCATCAAACACGCCAATTGACATGACAGAAGGCGTAGGCGTTACTTTGCCT

D35-33      TTTAGTAAGCCATCAAACACGCCAATTGACATGACAGAAGGCGTAGGCGTTACTTTGCCT
                   |                   |
D34-62      TTTAGTACGCCATCAAACACGCCAATAGACATGACAGAAGGCGTAGGCGTTACTTTGCCT
            ******* ******************* ********************************

D56-AG10    AAGGTTAATCAAGTTGAAGTTCTAATTACCCCTCGTTTACCTTCTAAGCTTTATTTATTTGA
                                                                      ||
D35-33      AAGGTTAATCAAGTTGAAGTTCTAATTACCCCTCGTTTACCTTCTAAGCTTTATTTAT-----
                 |        |             |                         |   ||
D34-62      AAGGTAAATCAAGTGGAAGTTCTAATTAGCCCTCGTTTACCTTCTAAGCTTTATGTATTCTGA
            ***** ******** ************* ************************** ***
```

PERCENT IDENTITY OF GROUP 3

	D56-AG10	D35-33	D34-62	
D56-AG10	***	98.9	95.1	SEQ ID No 13
D35-33		***	94.4	SEQ ID No 15
D34-62			***	SEQ ID No 17

ALIGNMENT OF GROUP 4

```
D56-AA7     ATTATACTTGCATTGCCAATTCTTGGCATCACTTTGGGACGTTTGGTTCAGAACTTTGAG
                                         |
D56-AE1     ATTATACTTGCATTGCCAATTCTTGGCATTACTTTGGGACGTTTGGTTCAGAACTTTGAG
                 |      |                   |        |     |
D185-BD3    ATTATCCTTGCACTGCCAATTCTTGGCATTACCTTGGGACGCTTGGTGCAGAACTTTGAG
            ***** ****** **************** ** ******** ***** ************

D56-AA7     CTGTTGCCTCCTCCAGGCCAGTCGAAGCTCGACACCACAGAGAAAGGTGGACAGTTCAGT

D56-AE1     CTGTTGCCTCCTCCAGGCCAGTCGAAGCTCGACACCACAGAGAAAGGTGGACAGTTCAGT
            |                |     |     |     |           |     |
D185-BD3    TTGTTGCCTCCTCCAGGACAGTCAAAGCTTGACACAACAGAGAAAGGCGGGCAATTCAGT
             **************** ***** ***** ***** *********** ** ** ******

D56-AA7     CTCCACATTTTGAAGCATTCCACCATTGTGTTGAAACCAAGGTCTTTCTGA
                 |
D56-AE1     CTCCATATTTTGAAGCATTCCACCATTGTGTTGAAACCAAGGTCTTGCTGA
              |  |                        |          |    || |
D185-BD3    CTGCACATTTTGAAGCATTCCACCATTGTGATGAAACCAAGATCTTTTTAA
            ** ** ************************ ********** ****   * *
```

PERCENT IDENTITY OF GROUP 4

	D56AA7	D56-AE1	D185-BD3	
D56AA7	***	98.2	87.7	SEQ ID No 19
D56-AE1		***	87.1	SEQ ID No 21
D185-BD3			***	SEQ ID No 143

FIGURE 51 COMPARISON OF SEQUENCE GROUPS

ALIGNMENT OF GROUP 5

```
D56A-AB6    ATTGCACTTGGGGTTGCATCCATGGAACTTGCTTTGTCAAATCTTCTTTATGCATTTGAT  SEQ ID No 27
                                |           |
D35-BB7     ATTGCACTTGGGGTTGCATCAATGGAACTTGCATTGTCAAATCTTCTTTATGCATTTGAT  SEQ ID No 23
                                |           |
D177-BA7    ATTGCACTTGGGGTTGCATCCATGGAACTTGCTTTGTCAAATCTTCTTTATGCATTTGAT  SEQ ID No 25

D144-AE2    ATTGCACTTGGGGTTGCATCCATGGAACTTGCTTTGTCAAATCTTCTTTATGCATTTGAT  SEQ ID No 29
            ******************** *********** ***************************

D56A-AB6    TGGGAGTTGCCTTATGGAGTGAAAAAAGAAGACATCGACACAAACGTTAGGCCTGGAATT
                    |    |    |                |          ||
D35-BB7     TGGGAGTTACCTTTTGGAATGAAAAAAGAAGACATTGACACAAACGCCAGGCCTGGAATT
                         ||   |           |             | |
D177-BA7    TGGGAGTTACCTTACGGAGTGAAAAAAGAAAACATTGACACAAATGTCAGGCCTGGAATT
                    |     |               |    |        |
D144-AE2    TGGGAGTTGCCTTATGGAGTGAAAAAAGAAGACATCGACACAAACGTTAGGCCTGGAATT
            ******** ****  *** *********** **** ******** *  ************

D56A-AB6    GCCATGCACAAGAAAAACGAACTTTGCCTTGTCCCAAAAAA-TTATTTATAA-----
            |       |                ||   |    |         |   |
D35-BB7     ACCATGCATAAGAAAAACGAACTTTATCTTATCCCTAAAAA-TTATCTATAG-----
                                     ||          |
D177-BA7    ACCATGCATAAGAAAAACGAACTTTGCCTTATCCCTAGAAA-TTATCTATAG-----
            |       |                     |    | |   |   |   ||||||||
D144-AE2    GCCATGCACAAGAAAAACGAACTTTGCCTTGTCCCAAAAAAATTATTTATAAATTAT
             ******* ****************  *** **** * *** *** ***

D56A-AB6    ------------------------

D35-BB7     ------------------------

D177-BA7    ------------------------
            ||||||||||||||||||||||||
D144-AE2    ATTGGGACGTGGATCTCATGCTAG
```

PERCENT IDENTITY OF GROUP 5

	D56A-AB6	D35-BB7	D144-AE2	D177-BA7	
D56A-AB6	***	90.6	97.1	91.8	SEQ ID No 27
D35-BB7		***	87.7	93.0	SEQ ID No 23
D144-AE2			***	88.9	SEQ ID No 29
D177-BA7				***	SEQ ID No 25

ALIGNMENT OF GROUP 6

```
D56-AG11    ATTTCGTTTGGTTTAGCTAATGCTTATTTGCCATTGGCTCAATTACTTTATCACTTTGAT
                       |                                   |        |
D179-AA1    ATTTCGTTTGGCTTAGCTAATGCTTATTTGCCATTGGCTCAATTACTATATCACTTCGAT
            *********** *********************************** ******** ***

D56-AG11    TGGGAACTCCCCACTGGAATCAAACCAAGCGACTTGGACTTGACTGAGTTGGTTGGAGTA
               |       ||        |
D179-AA1    TGGAAACTCCCTGCTGGAATCGAACCAAGCGACTTGGACTTGACTGAGTTGGTTGGAGTA
            *** *******  ******** **************************************

D56-AG11    ACTGCCGCTAGAAAAAGTGACCTTTACTTGGTTGCGACTCCTTATCAACCTCCTCAAAACTGA
                                                                       |
D179-AA1    ACTGCCGCTAGAAAAAGTGACCTTTACTTGGTTGCGACTCCTTATCAACCTCCTCAAAAGTGA
            *********************************************************** ***
```

FIGURE 51 COMPARISON OF SEQUENCE GROUPS

PERCENT IDENTITY OF GROUP 6

	SEQ ID No 31 D56-AG11	SEQ ID No 33 D179-AA1	
D56-AG11	***	95.6	SEQ ID No 31
D179-AA1		***	SEQ ID No 33

ALIGNMENT OF GROUP 7

```
D56-AC7     ATGCTATTTGGTTTAGCTAATGTTGGACAACCTTTAGCTCAGTTACTTTATCACTTCGAT  SEQ ID No 35

D144-AD1    ATGCTATTTGGTTTAGCTAATGTTGGACAACCTTTAGCTCAGTTACTTTATCACTTCGAT  SEQ ID No 37
            ************************************************************

D56-AC7     TGGAAACTCCCTAATGGACAAAGTCATGAGAATTTCGACATGACTGAGTCACCTGGAATT
                                  |   || |
D144-AD1    TGGAAACTCCCTAATGGACAAACTCACCAAAATTTCGACATGACTGAGTCACCTGGAATT
            ********************** ***  * ******************************

D56-AC7     TCTGCTACAAGAAAGGATGATCTTGTTTTGATTGCCACTCCTTATGATTCTTATTAA
                                    |                 || |
D144-AD1    TCTGCTACAAGAAAGGATGATCTTATTTTGATTGCCACTCCTGCTCATTCTTGA
            ************************ *****************  * ******
```

Deleted:

PERCENT IDENTITY OF GROUP 7

Deleted: ¶

	D144-AD1	D56-AC7	
D144-AD1	***	94.3	SEQ ID No 37
D56-AC7F		***	SEQ ID No 35

ALIGNMENT OF GROUP 9

```
D181-AB5    ATGTCGTTTGGTTTAGTTAACACTGGGCATCCTTTAGCTCAGTTGCTCTATTTCTTTGAC  SEQ ID No 41
                                  |              |             |
D73-AC9     ATGTCGTTTGGTTTAGTTAACACAGGGCATCCTTTAGCCCAGTTGCTCTATTGCTTTGAC  SEQ ID No 43
            *********************** ************** ************* *******

D181-AB5    TGGAAATTCCCTCATAAGGTTAATGCAGCTGATTTTCACACTACTGAAACAAGTAGAGTT
                  |     | |           ||        |
D73-AC9     TGGAAACTCCCTGACAAGGTTAATGCAAATGATTTTCGCACTACTGAAACAAGTAGAGTT
            ****** ***** * ************  ******** **********************

D181-AB5    TTTGCAGCAAGCAAAGATGACCTCTACTTGATTCCAACAAATCACATGGAGCAAGAGTAG
                                                |         |         |
D73-AC9     TTTGCAGCAAGCAAAGATGACCTCTACTTGATTCCCACAAATCACAGGGAGCAAGAATAG
            *********************************** ********** ********* ***
```

PERCENT IDENTITY OF GROUP 9

	D181-AB5	D73-AC9	
D181-AB5	***	92.8	SEQ ID No 41
D73-AC9		***	SEQ ID No 43

Deleted: ¶

¶

FIGURE 151 COMPARISON OF SEQUENCE GROUPS

ALIGNMENT OF GROUP 11

```
D58-AB9    ATGACTTATGCATTGCAAGTGGAACACCTAACAATGGCACATTTGATCCAGGGTTTCAAT   SEQ ID No 47
D56-AG9    ATGACTTATGCATTGCAAGTGGAACACCTAACAATGGCACATTTAATCCAGGGTTTCAAT   SEQ ID No 49
D35-BG11   ATGACTTATGCATTGCAAGTGGAACACTTAACAATGGCACATTTGATCCAAGGTTTCAAT   SEQ ID No 53
D34-25     ATGACTTATGCATTACAAGTGGAACACCTAACAATAGCACATTTGATCCAGGGTTTCAAT   SEQ ID No 63
D35-BA3    ATGACTTATGCATTGCAAGTGGAACACTTAACAATGGCACATTTGATCCAAGGTTTCAAT   SEQ ID No 57
D34-52     ATGACTTATGCATTACAAGTGGAACACCTAACAATAGCACATTTGATCCAGGGTTTCAAT   SEQ ID No 61
D56-AG6    ATGACTTATGCATTGCAAGTGGAACACCTAACAATGGCACATTTAATCCAGGGTTTCAAT   SEQ ID No 51
D35-42     ATGACTTATGCATTGCAAGTGGAACACTTAACAATGGCACATTTGATCCAAGGTTTCAAT   SEQ ID No 55
D34-57     ATGACTTATGCATTACAAGTGGAACACCTAACAATAGCACATTTGATCCAGGGTTTCAAT   SEQ ID No 59
           ************** ************ ******* ******** ***** *********

D58-AB9    TACAGAACTCCAACTGATGAGCCCTTGGATATGAAAGAAGGTGCAGGCATAACTATACGT
D56-AG9    TACAAAACTCCAAATGACGAGGCCTTGGATATGAAGGAAGGTGCAGGCATAACTATACGT
D35-BG11   TACAGAACTCCAAATGACGAGCCCTTGGATATGAAGGAAGGTGCAGGCATAACTATACGT
D34-25     TACAAAACTCCAAATGACGAGCCCCTGGATATGAAGGAAGGTGCAGGATTAACTATACGT
D35-BA3    TACAGAACTCCAAATGACGAGCCCTTGGATATGAAGGAAGGTGCAGGCATAACTATACGT
D34-52     TACAAAACTCCAAATGACGAGCCCTTGGATATGAAGGAAGGTGCAGGATTAACTATACGT
D56-AG6    TACAAAACTCCAAATGACGAGGCCTTGGATATGAAGGAAGGTGCAGGCATAACAATACGT
D35-42     TACAGAACTCCAAATGACGAGCCCTTGGATATGAAGGAAGGTGCAGGCATAACTATACGT
D34-57     TACAAAACTCCAAATGACGAGCCCTTGGATATGAAGGAAGGTGCAGGATTAACCATACGT
           **** ******** *** *** ** ********** ***********  **** ******

D58-AB9    AAGGTAAATCCTGTGAAAGTGATAATTACGCCTCGCTTGGCACCTGAGCTTTATTAA
D56-AG9    AAGGTAAATCCTGTGGAACTGATAATAGCGCCTCGCCTGGCACCTGAGCTTTATTAA
D35-BG11   AAGGTAAATCCTGTGGAACTGATAATAGCGCCTCGCCTGGCACCTGAGCTTTATTAA
D34-25     AAAGTAAATCCTGTAGAAGTGACAATTACGGCTCGCCTGGCACCTGAGCTTTATTAA
D35-BA3    AAGGTAAATCCTGCGGAACTGATAATAGCGCCTCGCCTGGCACCTGAGCTTTATTAA
D34-52     AAAGTAAATCCTGTAGAAGTGACAATTACGGCTCGCCTGGCACCTGAGCTTTATTAA
D56-AG6    AAGGTAAATCCAGTGGAATTGATAATAACGCCTCGCTTGGCACCTGAGCTTTACTAA
D35-42     AAGGTAAATCCTGTGGAACTGATAATAGCGCCCC---TGGCACCTGAGCTTTATTAA
D34-57     AAAGTAAATCCTGTAGAAGTGACAACTACGGCTCGCCTGGCACCTGAGCTTTATTAA
           ** ******** *   ** *** **   ** * *   **************** ***
```

FIGUR[redacted]51 COMPARISON OF SEQUENCE GROUPS

PERCENT IDENTITY OF GROUP 11

	D58-AB9	D56-AG9	D56-AG6	D35-BG11	D35-42	D35-BA3	D34-57	D34-52	D34-25	
D58-AB9	***	93.8	93.2	94.3	90.8	93.2	90.9	92.0	91.5	SEQ ID No 47
D56-AG9		***	96.6	97.2	94.2	96.6	91.5	92.6	92.0	SEQ ID No 49
D56-AG6			***	93.8	90.2	92.6	90.3	90.9	90.3	SEQ ID No 51
D35-BG11				***	97.1	99.4	90.9	92.0	91.5	SEQ ID No 53
D35-42					***	96.5	87.3	88.4	87.9	SEQ ID No 55
D35-BA3						***	90.3	91.5	90.9	SEQ ID No 57
D34-57							***	98.9	98.3	SEQ ID No 59
D34-52								***	99.4	SEQ ID No 61
D34-25									***	SEQ ID No 63

ALIGNMENT OF GROUP 14

```
D177-BD7    ATTAATTTTTCAATACCACTTGTTGAGCTTGCACTTGCTAATCTATTGTTTCATTATAAT  SEQ ID No 83

D177-BD5    ATTAATTTTTCAATACCACTTGTTGAGCTTGCACTTGCTAATCTATTGTTTCATTATAAT  SEQ ID No 69
            ************************************************************

D177-BD7    TGGTCACTTCCTGAGGGGATGCTACCTAAGGATGTTGATATGGAAGAAGCTTTGGGGATT
                          |         |
D177-BD5    TGGTCACTTCCTGAAGGGATGCTAGCTAAGGATGTTGATATGGAAGAAGCTTTGGGGATT
            ************** ********* ***********************************

D177-BD7    ACCATGCACAAGAAATCTCCCCTTTGCTTAGTAGCTTCTCATTATAACTTGTTGTGA
                                                          |       |||
D177-BD5    ACCATGCACAAGAAATCTCCCCTTTGCTTAGTAGCTTCTCATTATA-CTTGTTGA--
            ********************************************** *******
```

PERCENT IDENTITY OF GROUP 14

	D177-BD7	D177-BD5	
D177-BD7	***	96.8	SEQ ID No 83
D177-BD5		***	SEQ ID No 69

ALIGNMENT OF GROUP 15

Deleted: ¶

```
D56A-AG10   ATGCAACTTGGGCTTTATGCATTGGAAATGGCTGTGGCCCATCTTCTTCATTGTTTTACT  SEQ ID No 71

D58-AD12    ATGCAACTTGGGCTTTATGCATTGGAAATGGCTGTGGCCCATCTTCTTCATTGTTTTACT  SEQ ID No 75
                                   |        |                |   |
D58-BC5     ATGCAACTTGGGCTTTATGCATTAGAAATGGCAGTGGCCCATCTTCTTCTTTGCTTTACT  SEQ ID No 73
            *********************** ******** **************** *** ******

D56A-AG10   TGGGAATTGCCAGATGGTATGAAACCAAGTGAGCTTAAAATGGATGATATTTTTGGACTC

D58-AD12    TGGGAATTGCCAGATGGTATGAAACCAAGTGAGCTTAAAATGGATGATATTTTTGGACTC

D58-BC5     TGGGAATTGCCAGATGGTATGAAACCAAGTGAGCTTAAAATGGATGATATTTTTGGACTC
            ************************************************************

D56A-AG10   ACTGCTCCAAAAGCTAATCGACTCGTGGCTGTGCCTACTCCACGTTTGTTGTGTCCCCTT
                      |
D58-AD12    ACTGCTCCAAGAGCTAATCGACTCGTGGCTGTGCCTACTCCACGTTTGTTGTGTCCCCTT
                                                 |               |  |
D58-BC5     ACTGCTCCAAGAGCTAATCGACTCGTGGCTGTGCCTAGTCCACGTTTGTTGTGCCCACTT
            ********** ************************** *************** ** ***
```

FIGURE 51 COMPARISON OF SEQUENCE GROUPS

```
D56A-AG10       TATTAA
D58-AD12        TATTAA
D58-BC5         TATTAA
                ******
```

PERCENT IDENTITY OF GROUP 15

	D56A-AG10	D58-AD12	D58-BC5	
D56A-AG10	***	99.5	95.7	SEQ ID No 71
D58-AD12		***	96.2	SEQ ID No 75
D58-BC5			***	SEQ ID No 73

ALIGNMENT OF GROUP 16

```
D56-AD6     ATGCTTTGGAGTGCGAGTATAGTGCGCGTCAGCTACCTAACTTGTATTTATAGATTCCAA  SEQ ID No 87
D56-AC11    ATGCTTTGGAGTGCGAGTATAGTGCGCGTCAGCTACCTAACTTGTATTTATAGATTCCAA  SEQ ID No 77
D35-39      ATGCTTTGGAGTGCGAGTATAGTGCGCGTCAGCTACCTAACTTGTATTTATAGATTCCAA  SEQ ID No 79
D58-BH4     ATGCTTTGGAGTGCGAGTATAGTGCGCGTCAGCTACCTAACCTGTATTTATAGATTCCAA  SEQ ID No 81
            ****************************************** ******************

D56-AD6     GTATATGCTGGGTCTGTGTCCAGAGTAGCATGA
D56-AC11    GTATATGCTGGGTCTGTGTTCAGAGTAGCATGAD35-39
GTATATGCTGGGTCTGTGTTCAGAGTAGCATGA
D58-BH4     GTATATGCTGGGTCTGTGTTCAGAGTAGCATGA
            ******************* *************
```

Deleted: ¶
¶

PERCENT IDENTITY OF GROUP 16

	D56-AC11	D56-AD6	D58-BH4	D35-39	
D56-AC11	***	98.7	98.7	98.7	SEQ ID No 77
D56-AD6		***	98.7	98.7	SEQ ID No 87
D58-BH4			***	98.7	SEQ ID No 81
D35-39				***	SEQ ID No 79

ALIGNMENT OF GROUP 17

```
D73A-AD6    CTGAATTTTGCAATGTTAGAGGCAAAAATGGCACTTGCATTGATTCTACAACACTATGCT  SEQ ID No 89
D70A-BA11   CTGAATTTTGCAATGTTAGAGGCAAAAATGGCACTTGCATTGATTCTACAACACTATGCT  SEQ ID No 91
            ************************************************************

D73A-AD6    TTTGAGCTCTCTCCATCTTATGCACATGCTCCTCATACAATTATCACTCTGCAACCTCAA
D70A-BA11   TTTGAGCTCTCTCCATCTTATGCACACGCTCCTCATACAATTATCACTCTGCAACCTCAA
            ************************** *********************************

D73A-AD6    CATGGTGCTCCTTTGATTTTGCGCAAGCTGTAG
D70A-BA11   CATGGTGCTCCTTTGATTTTGCGCAAGCTGTAG
            *********************************
```

FIGURE 51 COMPARISON OF SEQUENCE GROUPS

PERCENT IDENTITY OF GROUP 17

PCT/US04/34218

	D73A-AD	70A-BA11	
D73A-AD6	***	99.3	SEQ ID No 89
D70A-BA11		***	SEQ ID No 91

ALIGNMENT OF GROUP 18

```
D70A-AB5    CAAAACTTCGCGATTTTGGAAGCAAAAATGGCTATAGCTATGATTCTACAACGCTTCTCC   SEQ ID No 95

D70A-AA8    CAAAACTTCGCGATTTTGGAAGCAAAAATGGCTATAGCTATGATTCTACAACGCTTCTCC   SEQ ID No 97
            ************************************************************

D70A-AB5    TTCGAGCTCTCCCCATCTTATACACACTCTCCATACACTGTGGTCACTTTGAAACCCAAA

D70A-AA8    TTCGAGCTCTCTCCATCTTATACACACTCTCCATACACTGTGGTCACTTTGAAACCCAAA
            ***************************** ******************************

D70A-AB5    TATGGTGCTCCCCTAATAATGCACAGGCTGTAG
D70A-AA8    TATGGTGCTCCCCTAATAATGCACAGGCTGTAG
            *********************************
```

Deleted: 1

PERCENT IDENTITY OF GROUP 18

	D70A-AB5	D70A-AA8	
D70A-AB5	***	99.6	SEQ ID No 95
D70A-AA8		***	SEQ ID No 97

ALIGNMENT OF GROUP 19

```
D70A-AB8    CAAAATTTTGCCATGTTAGAAGCAAAGATGGCTCTGTCTATGATCCTGCAACGCTTCTCT   SEQ ID No 99

D70A-BH2    ATAAACTTTGCAATGACAGAAGCGAAGATGGCTATGGCTATGATTCTGCAACGCTTCTCC   SEQ ID No 101

D70A-AA4    ATAAACTTTGCAATGGCAGAAGCGAAGATGGCTATGGCTATGATTCTGCAACGCTTCTCC   SEQ ID No 103
              *** ***** ***  ****** ****   ** ** ******* ** ***********

D70A-AB8    TTTGAACTGTCTCCGTCTTATGCACATGCCCCTCAGTCCATATTAACCGT-CAGCCACAA

D70A-BH2    TTTGAGCTATCTCCATCTTACACACATGCTCCACAGTCTGTAATAACTATGCAACCCCAA

D70A-AA4    TTTGAGCTATCTCCATCTTACACACATGCTCCACAGTCTGTAATAACTATGCAACCCCAA
            ***** ** ***** *****  ******* ** *****  ** ****  * ** ** **

D70A-AB8    TATGGTGCTCCACTTATTTTCCACAAGCTATAA

D70A-BH2    TATGGTGCTCCTCTTATATTGCACAAATTGTAA
D70A-AA4    TATGGTGCTCCTCTTATATTGCACAAATTGTAA
            *********** ***** ** ** **  * **
```

Deleted: 1

PERCENT IDENTITY OF GROUP 19

	D70A-AB8	D70A-AA4	D70A-BH2	
D70A-AB8	***	77.8	77.8	SEQ ID No 99
D70A-AA4		***	99.3	SEQ ID No 101
D70A-BH2			***	SEQ ID No 103

ALIGNMENT OF GROUP 20

FIGURE 51 COMPARISON OF SEQUENCE GROUPS


```
D70A-BA1    CAAAACTTTGCAATGATGGAAGCAAAAATGGCAGTAGCTATGATACTACAAAAATTTTCC   SEQ ID No 105
                                                              |
D70A-BA9    CAAAACTTTGCAATGATGGAAGCAAAAATGGCAGTAGCTATGATACTACATAAATTTTCC   SEQ ID No 107
            ************************************************** *********

D70A-BA1    TTTGAACTATCCCCTTCTTATACACATGCTCCATTTGCAATTGTGACTATTCATCCTCAG

D70A-BA9    TTTGAACTATCCCCTTCTTATACACATGCTCCATTTGCAATTGTGACTATTCATCCTCAG
            ************************************************************

D70A-BA1    TATGGTGCTCCTCTGCTTATGCGCAGACTTTAA

D70A-BA9    TATGGTGCTCCTCTGCTTATGCGCAGACTTTAA
            *********************************
```

PERCENT IDENTITY OF GROUP 20

	D70A-BA1	D70A-BA9	
D70A-BA1	***	99.4	SEQ ID No 105
D70A-BA9		***	SEQ ID No 107

ALIGNMENT OF GROUP 22

```
D144-AH1    TATAGCTTGGGGCTCAAGGAGATTCAAGCTAGCTTAGCTAATCTTCTACATGGATTTAAC   SEQ ID No 113
            |                  |
D34-65      CATAGCTTGGGGCTCAAGGTGATTCAAGCTAGCTTAGCTAATCTTCTACATGGATTTAAC   SEQ ID No 115
            |     |            |
D181-AC5    TATAGCATGGGGCTCAAGGCGATTCAAGCTAGCTTAGCTAATCTTCTACATGGATTTAAC   SEQ ID No 111
             *****:************ ****************************************

D144-AH1    TGGTCATTGCCTGATAATATGACTCCTGAGGACCTCAACATGGATGAGATTTTTGGGCTC

D34-65      TGGTCATTGCCTGATAATATGACTCCTGAGGACCTCAACATGGATGAGATTTTTGGGCTC

D181-AC5    TGGTCATTGCCTGATAATATGACTCCTGAGGACCTCAACATGGATGAGATTTTTGGGCTC
            ************************************************************

D144-AH1    TCTACACCTAAAAAATTTCCACTTGCTACTGTGATTGAGCCAAGACTTTCACCAAAACTT

D34-65      TCTACACCTAAAAAATTTCCACTTGCTACTGTGATTGAGCCAAGACTTTCACCAAAACTT

D181-AC5    TCTACACCTAAAAAATTTCCACTTGCTACTGTGATTGAGCCAAGACTTTCACCAAAACTT
            ************************************************************

D144-AH1    TACTCTGTTTGA

D34-65      TACTCTGTTTGA

D181-AC5    TACTCTGTTTGA
            ************
```

PERCENT IDENTITY OF GROUP 22

	D34-65	D181-AC5	D144-AH1	
D34-65	***	98.4	99.0	SEQ ID No 115
D181-AC5		***	99.0	SEQ ID No 111
D144-AH1			***	SEQ ID No 113

ALIGNMENT OF GROUP 25

Deleted: ¶

```
D58-AA1     TTGGGCTTGGCAACGGTGCATGTGAATTTGATGTTGGCCCGAATGATTCAAGAATTTGAA   SEQ ID No 121
```

FIGUR[illegible] COMPARISON OF SEQUENCE GROUPS

```
D185-BC1     TTGGGCTTGGCAACGGTGCATGTGAATTTGATGTTGGCCCGAACGATTCAAGAATTTGAA  SEQ ID No 133
D185-BG2     TTGGGCTTGGCAACGGTGCATGTGAATTTGATGTTGGCCCGAATGATTCAAGAATTTGAA  SEQ ID No 135
             ******************************************** ****************

D58-AA1      TGGTCCGCTTACCCGGAAAATAGGAAAGTGGATTTTACTGAGAAATTGGAATTTACTGTG
D185-BC1     TGGTCCGCTTACCCGGAAAATAGGAAAGTGGATTTTACTGAGAAATTGGAATTTACTGTG
D185-BG2     TGGTCCGCTTACCCGGAAAATAGGAAAGTGGATTT-ACTGAGAAATTGGAATTTACTGTG
             *********************************** ************************

D58-AA1      GTGATGAAAAATCCTTTAAGAGCTAAGGTCAAGCCAAGAATGCAAGTGGTGTAA
D185-BC1     GTGATGAAAAACCCTTTAAGAGCTAAGGTCAAGCCAAGAATGCAAGTGGTGTAA
D185-BG2     GTGA--------------------------------------------------
             ****
```

PERCENT IDENTITY OF GROUP 25

	D58-AA1	D185-BG2	D185-BC1	
D58-AA1	***	95.9	98.9	SEQ ID No 121
D185-BG2		***	95.1	SEQ ID No 135
D185-BC1			***	SEQ ID No 133

ALIGNMENT OF GROUP 28

```
D177-BF7     ATCACATTTGCTAAGTTTGTGAATGAGCTAGCATTGGCAAGATTAATGTTCCATTTTGAT  SEQ ID No 127
D185-BD2     ATCACATTTGCTAAGTTTGTGAATGAGCTAGCATTGGCAAGATTAATGTTCCATTTTGAT  SEQ ID No 139
D185-BE1     ATCACATTTGCTAAGTTTGTGAATGAGCTAGCATTGGCAAGATTAATGTTCCATTTTGAT  SEQ ID No 137
             ************************************************************

D177-BF7     TTCTCGCTACCAAAAGGAGTTAAGCATGAGGATTTGGACGTGGAGGAAGCTGCTGGAATT
D185-BD2     TTCTCGCTACCAAAAGGAGTTAAGCATGCGGATTTGGACGTGGAGGAAGCTGCTGGAATT
D185-BE1     TTCTCGCTACCAAAAGGAGTTAAGCATGAGGATTTGGACGTGGAGGAAGCTGCTGGAATT
             **************************** *******************************

D177-BF7     ACTGTTAGAAGGAAGTTCCCCCTTTTAGCCGTCGCCACTCCATGCTCGTGA
D185-BD2     ACTGTTAGAAGGAAGTTCCCCCTTTTAGCCGTCGCCACTCCATGCTCGTGA
D185-BE1     ACTGTTAGGAGGAAGTTCCCCCTTTTAGCCGTCGCCACTCCATGCTCGTGA
             ******** ******************************************
```

PERCENT IDENTITY OF GROUP 28

	D177-BF7	D185-BD2	D185-BE1	
D177-BF7	***	99.4	99.4	SEQ ID No 127
D185-BD2		***	98.8	SEQ ID No 139
D185-BE1			***	SEQ ID No 137

ALIGNMENT OF GROUP 30

FIGURE [redacted] 01: COMPARISON OF SEQUENCE GROUPS

```
D70A-AA12   ATGTCATTTGGTTTAGCTAATGTTTACTTACCATTGGCTCAATTACTCTATCACTTTGAC   SEQ ID No 131
             |         |           |        |  |          || |      |      |
D176-BF2    ATATCATTTGGTTTGGCTAATGTTTATTTGCCACTAGCTCAATTGTTATATCATTTTGAT   SEQ ID No 85
            ** ************ ****** **** ** *** * ********  * ***** *****

D70A-AA12   TGGAAACTCCCAACCGGAATCAAGCCAAGAGACTTGGACTTGACCGAATTATCGGAATA
                       |  |         ||    |        |    |  | ||  |   |
D176-BF2    TGGAAACTCCCTACTGGAATCAATTCAAGTGACTTGGACATGACTGAGTCGTCAGGAGTA
            *********** ** ********  **** ********* **** ** *  ** *** **

D70A-AA12   ACTATTGCTAGAAAGGGTGACCTTTACTTAAATGCTACTCCTTATCAACCTTCTCGAGAGTAA
               ||          |    | | |      | |          |         |       |     |
D176-BF2    ACTTGTGCTAGAAAGAGTGATTTATACTTGACTGCTACTCCATATCAACTTTCTCAAGAGTGA
            ***  ********** ****  * ***** * ********** ******* ***** ***** *
```

PERCENT IDENTITY OF GROUP 30

	D176-BF2	D70A-AA12	
D176-BF2	***	77.0	SEQ ID No 85
D70A-AA12		***	SEQ ID No 131

FIGURE 152A: Alignment of Full Length Clones

GROUP 1

	ExxRxxP					FxPERF		Gx RxC				
D208-AD9 98.8	EVLRLYPPGP	LLVPHENVED	CVVSGYHIPK	GTRLFANVMK	LQRDPKLWSD	PDTFDPERFI	ATDIDFRGQY	YKYIPFGPGR	RSC	SEQ. ID. No. 299
D120-AH4 97.6	EVLRLYPPGP	LLVPHENVED	CVVSGYHIPK	GTRLFANVMK	LLRDPKLWPD	PDTFDPERFI	ATDIDFRGQY	YKYIPFGSGR	RSC	SEQ. ID. No. 300
D121-AA8 91.6	EVLRLYPPGP	LLVPHENVED	CVVSGYHIPK	GTRLFANVMK	LQRDPKLWSD	PDTFDPERFI	ATDIDFRGQY	YKYIPFGSGR	RSC	SEQ. ID. No. 301
D122-AF10 91.6	EVLRLYPPGP	LLVPHENVED	CVVSGYHIPK	GTRLFANVMK	LQRDPKLWSN	PDKFDPERFF	ADDIDYRGQH	YEFIPFGSGR	RSC	SEQ. ID. No. 302
D103-AH3 98.8	KVLRLYPPGP	LLVPHENVKD	CVVSGYHIPK	GTRLFANVMK	LQRDPKLLSN	PDKFDPERFI	AGDIDFRGHH	YEFIPSGSGR	RSC	SEQ. ID. No.
D208-AC8 98.8	KVLRLYPPGP	LLVPHENVKD	CVVSGYHIPK	GTRLFANVMK	LQRDPKLLSN	PDKFDPERFI	AGDIDFRGHH	YEFIPFGSGR	RSC	SEQ. ID. No. 304
D235-AB1	KVLRLYPPGP	LLVPHEYVKD	CVVSGYHIPK	GTRLFANVMK	LQRDPKLLSN	PDKFDPERFI	AGDIDFRGHH	YEFIPFGSGR	RSC	SEQ. ID. No. 305

GROUP 2

	ExxRxxP					FxPERF			GxRxC	
D244-AD4 100.0	ETLRLYPPVP	FLLPHEAVQD	CKVTGYHIPK	GTRLYINAWK	VHRDPEIWSE	PEKFMPNRFL	TSKANIDARG	QNFEFIPFGS	GRRSC	SEQ. ID. No. 306
D244-AB6 98.8	ETLRLYPPVP	FLLPHEAVQD	CKVTGYHIPK	GTRLYINAWK	VHRDPEIWSE	PEKFMPNRFL	TSKANIDARG	QNFEFIPFGS	GRRSC	SEQ. ID. No. 307
D285-AA8 100.0	ETLRLFPPVP	FLLPHEAVQD	CKVTGYHIPK	GTRLYINAWK	VHRDPEIWSE	PEKFMPNRFL	TSKANIDARG	QNFEFIPFGS	GRRSC	SEQ. ID. No. 308
D285-AB9 97.6	ETLRLFPPVP	FLLPHEAVQD	CKVTGYHIPK	GTRLYINAWK	VHRDPEIWSE	PEKFMPNRFL	TSKANIDARG	QNFEFIPFGS	GRRSC	SEQ. ID. No. 309
D268-AE2	ETLRLYPPVP	FLLPHEAVQD	CKVTGYHIPK	GTRLYINAWK	VHRDSEIWSE	PEKFMPNRFL	TSKANIDARG	QNFEFIPFGS	GRRSC	SEQ. ID. No. 31

GROUP 3

	ExxRxxP					FxPERF		GxRx	C	
D100A-AC3 97.6	ETFRMYPAGP	LLVPHESSEE	TTVGGYRVPG	GTMLLVNLWA	IHNDPKLWDE	PRKFKPERFE	GLEGVRDGYK	MMPFGSGRRS	C	SEQ. ID. No. 311
D100A-BE2	ETFRMYPAGP	LLVPHESSEE	TTVGGYRVPG	GTMLLVNLWA	IHNDPKLWDE	PRKFKPERFQ	GLDGVRDGYK	MMPFGSGRRS	C	SEQ. ID. No. 312

FIGURE 152B: Alignment of Full Length Clones

```
GROUP 4
                ExxRxxP                                                      FxPERF                             Gx RxC
D205-BG9        ETMRLYTPIP LLLPHYSTKD CIVEGYDVPK HTMLFVNAWA IHRDPKVWEE PDKFKPERFE ATEGETERFN YKLVPFGMGR RAC SEQ. ID. No. 313
 100.0
D205-BE9        ETMRLYTPIP LLLPHYSTKD CIVEGYDVPK HTMLFVNAWA IHRDPKVWEE PDKFKPERFE ATEGETERFN YKLVPFGMGR RAC SEQ. ID. No. 314
 100.0
D205-AH4        ETMRLYTPIP LLLPHYSTKD CIVEGYDVPK HTMLFVNAWA IHRDPKVWEE PDKFKPERFE ATEGETERFN YKLVPFGMGR RAC SEQ. ID. No. 315

GROUP 5
                ExxRxxP                                                      FxPERF                             Gx RxC
D259-AB9        ETMRLHPVAP MLVPRECRED IKVAGYDVQK GTRVLVSVWT IGRDPTLWDE PEVFKPERFH EKSIDVKGHD YELLPFGAGR RMC SEQ. ID. No. 316
 100.0
D257-AE4        ETMRLHPVAP MLVPRECRED IKVAGYDVQK GTRVLVSVWT IGRDPTLWDE PEVFKPERFH EKSIDVKGHD YELLPFGAGR RMC SEQ. ID. No. 317
 98.8                                                                                   |
D147-AD3        ETMRLHPVAP MLVPRECRED IKVAGYDVQK GTRVLVSVWT IGRDPTLWDE PEVFKPERFH ERSIDVKGHD YELLPFGAGR RMC SEQ. ID. No. 318

GROUP 6
                ExxRxxP                                                      FxPERF                             Gx RxC
D249-AEB        EALRLHPPTP LMLPHRASAS VKIGGYDIPK GSIVHVNVWA VARDPAVWKN PLEFRPERFL EEDVDMKGHD YRLLPFGAGR RVC SEQ. ID. No. 319
 98.8                      |
D248-AA6        EALRLHPPTP LMLPHKASAS VKIGGYDIPK GSIVHVNVWA VARDPAVWKN PLEFRPERFL EEDVDMKGHD YRLLPFGAGR RVC SEQ. ID. No. 320

GROUP 7
                ExxRxxP                                                      FxPERF                             Gx RxC
D233-AG7        ETLRLHPLGT MLAPHCAIED CNVAGYDIQK GTTFLVNVWT IGRDPKYWDR AQEFLPERFL ENDIDMDGHN FAFLPFGSGR RRC SEQ. ID. No. 321
 98.8                                            |
D224-BD11       ETLRLHPLGT MLAPHCAIED CNVAGYDIQK GTTVLVNVWT IGRDPKYWDR AQEFLPERFL ENDIDMDGHN FAFLPFGSGR RRC SEQ. ID. No. [illegible]
 100.0
D224-AF10       ETLRLHPLGT MLAPHCAIED CNVAGYDIQK GTTVLVNVWT IGRDPKYWDR AQEFLPERFL ENDIDMDGHN FAFLPFGSGR RRC SEQ. ID. No. 323

GROUP 8
                ExxRxxP                                                      FxPERF                             Gx RxC
D105-AD6        EVLRLYPAGY VINRMVNKET KLGNLCLPAG VQLVLPTMLL QHDTEIWGDD AMEFNPERFS DGISKATKGK LVFFPFSWGP RIC SEQ. ID. No. 324
 100.0
D215-AB5        EVLRLYPAGY VINRMVNKET KLGNLCLPAG VQLVLPTMLL QHDTEIWGDD AMEFNPERFS DGISKATKGK LVFFPFSWGP RIC SEQ. ID. No. 325
 95.2                      |    |                     |   |
D135-AE1        EVLRLYPAGY AINRMVTKET KLGNLCLPAG VQLLLPTILL QHDTEIWGDD AMEFNPERFS DGISKATKGK LVFFPFSWGP RIC SEQ. ID. No. 326
```

FIGURE 152C: Alignment of Full Length Clones

```
GROUP 9
               ExxRxxP                                                                  FxPERF                                Gx RxC
D87A-AF3       ESLRLYPPIA TRTRRTNEET KLGELDLPKG ALLFIPTILL HLDKEIWGED ADEFNPERFS EGVAKATKGK MTYFPFGAGP RKC SEQ. ID. No. 327
 100.0
D210-BD4       ESLRLYPPIA TRTRRTNEET KLGELDLPKG ALLFIPTILL HLDREIWGED ADEFNPERFS EGVAKATKGK MTYFPFGAGP RKC SEQ. ID. No. 328

GROUP 10
               ExxRxxP                                                                  FxPERF                                Gx RxC
D89-AB1        ETLRMHPPIP LLVPRECMED TKIDGYNIPF KTRVIVNAWA IGRDPESWDD PESFMPERFE NSSIDFLGNH HQFIPFGAGR RIC SEQ. ID. No. [illegible]
 100.0
D89-AD2        ETLRMHPPIP LLVPRECMED TKIDGYNIPF KTRVIVNAWA IGRDPESWDD PESFMPERFE NSSIDFLGNH HQFIPFGAGR RIC SEQ. ID. No. 330
 100.0
D163-AG12      ETLRMHPPIP LLVPRECMED TKIDGYNIPF KTRVIVNAWA IGRDPESWDD PESFMPERFE NSSIDFLGNH HQFIPFGAGR RIC SEQ. ID. No. 331
  98.8                                                                            |
D163-AG11      ETLRMHPPIP LLVPRECMED TKIDGYNIPF KTRVIVNAWA IGRDPQSWDD PESFTPERFE NNSIDFLGNH HQFIPFGAGR RIC SEQ. ID. No. 332
 100.0
D163-AF12      ETLRMHPPIP LLVPRECMED TKIDGYNIPF KTRVIVNAWA IGRDPQSWDD PESFTPERFE NNSIDFLGNH HQFIPFGAGR RIC SEQ. ID. No. 333

GROUP 11
               ExxRxxP                                                                  FxPERF                                Gx RxC
D267-AF10      ETLRMHPPVP LLGPRECRDQ TEIDGYTVPI KARVMVNAWA IGRDPESWED PESFKPERFE NTSVDLTGNH YQFIPFGSGR RMC SEQ. ID. No. 334
 100.0
D96-AC2        ETLRMHPPVP LLGPRECRDQ TEIDGYTVPI KARVMVNAWA IGRDPESWED PESFKPERFE NTSVDLTGNH YQFIPFGSGR RMC SEQ. ID. No. 335
 100.0
D96-AB6        ETLRMHPPVP LLGPRECRDQ TEIDGYTVPI KARVMVNAWA IGRDPESWED PESFKPERFE NTSVDLTGNH YQFIPFGSGR RMC SEQ. ID. No. 336
  96.4                             |
D207-AA5       ETLRMHPPVP LLGPRECREQ TEIDGYTVPL KARVMVNAWA IGRDPESWED PESFKPERFE NISVDLTGNH YQFIPFGSGR RMC SEQ. ID. No. 33[illegible]
 100.0
D207-AB4       ETLRMHPPVP LLGPRECREQ TEIDGYTVPL KARVMVNAWA IGRDPESWED PESFKPERFE NISVDLTGNH YQFIPFGSGR RMC SEQ. ID. No. 338
 100.0
D207-AC4       ETLRMHPPVP LLGPRECREQ TEIDGYTVPL KARVMVNAWA IGRDPESWED PESFKPERFE NISVDLTGNH YQFIPFGSGR RMC SEQ. ID. No. 339

GROUP 12
               ExxRxxP                                                                  FxPERF                                Gx RxC
D98-AG1        ETLRLHPPTP LLVPRECREE TEIEGFTIPL KSKVLVNVWA IGRDPENWKN PECFIPERFE NSSIEFTGNH FQLLPFGAGR RIC SEQ. ID. No. 340
 100.0
D98-AA1        ETLRLHPPTP LLVPRECREE TEIEGFTIPL KSKVLVNVWA IGRDPENWKN PECFIPERFE NSSIEFTGNH FQLLPFGAGR RIC SEQ. ID. No. 341
```

FIGURE 152D: Alignment of Full Length Clones

GROUP 13

```
                  ExxRxxP                                                                  FxPERF                                 Gx RxC
D209-AA10         ETLRLHPPVP LLLPRECREE TNINGYTIPV KTKVMVNVWA LGRDPKYWND AETFMPERFE QCSKDFVGNN FEYLPFGGGR RIC SEQ. ID. No. 342
 100.0
D209-AA12         ETLRLHPPVP LLLPRECREE TNINGYTIPV KTKVMVNVWA LGRDPKYWND AETFMPERFE QCSKDFVGNN FEYLPFGGGR RIC SEQ. ID. No. 343
 100.0
D209-AH10         ETLRLHPPVP LLLPRECREE TNINGYTIPV KTKVMVNVWA LGRDPKYWND AETFMPERFE QCSKDFVGNN FEYLPFGGGR RIC SEQ. ID. No. 344
 100.0
D209-AH12         ETLRLHPPVP LLLPRECREE TNINGYTIPV KTKVMVNVWA LGRDPKYWND AETFMPERFE QCSKDFVGNN FEYLPFGGGR RIC SEQ. ID. No.
 97.6                                                                                      |
D90a-BB3          ETLRLHPPVP LLLPRECREE TNINGYTIPV KTKVMVNVWA LGRDPKYWDD AETFKPERFE QCSKDFVGNN FEYLPFGGGR RIC SEQ. ID. No. 346
```

GROUP 14

```
                  ExxRxxP                                                                  FxPERF                                 Gx RxC
D129-AD10         ETLRLHPPIP LLLHETAEES TVSGYHIPAK SHVIINSFAI GRDKNSWEDP ETYKPSRFLK EGVPDFKGGN FEFIPFGSGR RSC SEQ. ID. No. 347
 100.0
D104A-AE8         ETLRLHPPIP LLLHETAEES TVSGYHIPAK SHVIINSFAI GRDKNSWEDP ETYKPSRFLK EGVPDFKGGN FEFIPFGSGR RSC SEQ. ID. No. 348
```

GROUP 15

```
                  ExxRxxP                                                                  FxPERF                                 Gx RxC
D228-AH8          EIFRLYPPAP LLVPRESMEK TILEGYEIRP RTIVHVNAWA IARDPEIWEN PDEFIPERFL NSSIDYKGQD FELLPFGAGR RGC SEQ. ID. No. 349
 100.0
D228-AD7          EIFRLYPPAP LLVPRESMEK TILEGYEIRP RTIVHVNAWA IARDPEIWEN PDEFIPERFL NSSIDYKGQD FELLPFGAGR RGC SEQ. ID. No. 350
 100.0
D250-AC11         EIFRLYPPAP LLVPRESMEK TILEGYEIRP RTIVHVNAWA IARDPEIWEN PDEFIPERFL NSSIDYKGQD FELLPFGAGR RGC SEQ. ID. No. 351
 100.0
D247-AH1          EIFRLYPPAP LLVPRESMEK TILEGYEIRP RTIVHVNAWA IARDPEIWEN PDEFIPERFL NSSTDYKGQD FELLPFGAGR RGC SEQ. ID. No.
```

GROUP 16

```
                  ExxRxxP                                                                  FxPERF                                 GxRxC
D128-AB7          EALRLRMAIP LLVPHMNLHD AKLGGFDIPA ESKILVNAWW LANNPAHWKK PEEFRPERFF EEEKHVEANG NDFRYLPFGV GRRSC SEQ. ID. No. 353
 98.8                                        |
D243-AA2          EALRLRMAIP LLVPHMNLHD AKLGGLDIPA ESKILVNAWW LANNPAHWKK PEEFRPERFF EEEKHVEANG NDFRYLPFGV GRRSC SEQ. ID. No. 354
 97.7             |                          |
D125-AF11         ETLRLRMAIP LLVPHMNLHD AKLGGFDIPA ESKILVNAWW LANNPAHWKK PEEFRPERFF EEEKHVEANG NDFRYLPFGV GRRSC SEQ. ID. No. 355
```

FIGURE 152E: Alignment of Full Length Clones

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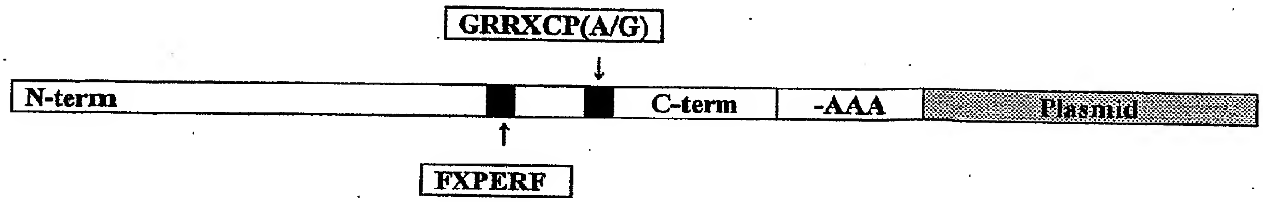
GROUP 17
              ExxRxxP                                                   FxPERF                     Gx RxC
D284-AH5      ESLRLYSPVV SLIRRPNEDA ILGNVSLPEG VLLSLPVILL HHDEEIWGKD -KKFNPERFR DGVSSATKGQ VTFFPFTWGP RIC SEQ. ID. NO: 356
 86.7               |    | |   |  | |  |    |    |                   |   |
D110-AF12     ESLRLYPPVV TLTRRPKEDT VLGDVSLPAG VLISLPVILL HHDEEIWGKD AKKFKPERFR DGVSSATKGQ VTFFPFTWGP RIC SEQ. ID. NO: 357
```

Figure 153: Cloning of Cytochrome P450 cDNA Fragments by PCR



DM	FXPERF –for	5'TTYIIICCIGARMGITTY-3'
DM4	GRRXCP(A/G)-for	5'-GGIMGIMGIIIITGYCCIGS-3'
DM12	FKPERF-for	5'-TTYAARCCTGAGAGATT-3'
DM13	PERFL-for	5'-CCAGARAGATTCTTG-3'
DM17	GRRMCP-for	5'-GGRMGRMGRATGTGYCC-3'
OLIGO d(T)		5'-TTTTTTTTTTTTTTTTTTN-3'
T7		5'-ATTATGCTGAGTGATATCCC-3'
SP6		5'-ATTTAGGTGACACTATAG-3'

I = DeoxyIInosine; Y = C, T; M = A,C; R = A,G; S = C,G; N= A,T,C,G